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## ORIGINAL COMMUNICATIONS.

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### A NEW METHOD OF OPERATING UPON TURBINAL HYPERTROPHIES WITH A DESCRIPTION OF THE INSTRUMENTS AND THE TECHNIC OF THE INTRANASAL SUTURE.\*

BY SIDNEY YANKAUER, M.D., NEW YORK CITY.

There are certain conditions affecting the middle and inferior turbinates that cannot be relieved without surgical interference: these are familiarly known to us as enlarged middle turbinate and hypertrophied lower turbinate.

The operative procedures upon the various forms of enlarged middle turbinate will be discussed on some other occasion; at the present time we will consider only those cases of lower turbinal hypertrophy in which the enlargement is due to organic thickening of the mucous membrane from hyperplasia of its connective tissue and glandular elements, in which its surface is thrown into folds and has a polypoid or mulberry appearance. The disease may involve the anterior end, the inferior border, the posterior end, the periosteum and bone, either singly or in varying combinations. In these cases, the function of the organ, in other words, its contraction and dilatation with the varying conditions of the surrounding atmosphere, is interfered with or destroyed, the drainage of the lower meatus is imperfect, the respiratory channel is obstructed, and a number of reflex and nervous symptoms are usually present.

For the removal of these hypertrophies a variety of surgical methods and instruments have been devised: the spoke-shave, the saw, the crushing forceps, the cutting forceps, the scissors, the punch, the snare. That the galvano cautery, used either by superficial cauterization or by ignipuncture, still has its adherents, is witnessed

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by the cases of synechia which we see with more or less frequency, resulting therefrom; but cauterization with the mineral acids seems to have been entirely abandoned.

It is an old rule in medicine that where there are many remedies for a condition, none of them is satisfactory; and if we examine these various procedures we find that they have one defect in common, namely, that each one of them leaves an open wound which must heal by slow process of granulation. In the case of the caustic methods, when the slough is cast off, a granulating wound remains, similar in all respects to that left after the use of cutting instruments.

That this slow process of healing by granulation is the true cause of all the disagreeable after-effects of even a partial turbinectomy will be evident from a brief consideration of the disadvantages and complications which have been reported as following this operation. Even when the nose is packed after the operation, hemorrhage from the dilated veins may be severe. When the packing is removed there is always some bleeding, so that repacking may be required. The removal of crusts and blood clots causes frequent small hemorrhages which continue during the entire course of the healing. True secondary hemorrhages, from sloughing of the ends of the blood-vessels, are said to occur in nearly one per cent of the cases. It takes several days before visible granulations begin to form, but even in favorable cases, where the granulations do not become exuberant or polypoid, epithelialization is not completed for several weeks, the time of healing, according to the latest reports, being from 2 to 8 weeks. During this time it is practically impossible to prevent infection of the wound. While this infection is rarely severe enough to cause general symptoms, it does cause increased secretion and crust formation, and delays the healing; it gives rise to an infiltration of the edges of the wound, which may remain as a permanent thickening and thus defeat the object of the operation, while if, in the endeavor to prevent this, larger portions of the turbinate are removed, the resulting loss of function is a cause of permanent annoyance. The wound always becomes larger than the excised portion of tissue, owing to the retraction of the cut edges of the mucous membrane, and when healing is finally completed after weeks of troublesome after treatment, there is left a broad, dry cicatricial surface, which is covered with squamous epithelium, a condition which should be avoided whenever it is possible to do so. Scar tissue is unfavorable to drainage, and that portion of the turbinate which is covered with the scar has permanently lost its function.

Now, in the present state of modern surgery, wounds made in a clean field, in other parts of the body, are not left open and allowed to heal by granulation, but the wound is sutured and healing by primary union is the rule. If proper asepsis has been maintained, the edges of the wound become agglutinated in a few hours, and in three days healing is practically completed. All the dangers and annoyances of the infected granulating wound are avoided, and to attempt to compare, or rather to contrast, the advantages of an aseptic sutured wound with the disadvantages of an infected granulating wound would be altogether too primitive. There is no reason why these surgical principles should not apply to the interior of the nose as well as to other parts of the body. The writer has, accordingly, devised and perfected a method of sewing up an intranasal wound, and has succeeded in demonstrating that primary union may be obtained in our operations upon the turbinal bodies, if we suture the wound after the excision of the hypertrophied parts.

It is perfectly feasible in actual practice to insert a suture into a wound in any part of the nasal chambers which is accessible to direct vision; upon the turbinated bodies, as far back as the posterior end of the inferior turbinate, and as high up as the anterior end of the middle turbinate. Each suture is closed by tying its ends together with a double or triple knot, as firmly, as securely and as accurately as it can be done upon the external parts of the body. Nor is this procedure a particularly difficult one; in fact in the anterior half of the nose, say within 4 cm. from the naso-labial junction, it is a simple and easy thing to do. It is accomplished with specially devised instruments which are few in number, very simple in their construction, and inexpensive, and by means of a novel technic which can be readily acquired by any surgeon. It is no more difficult to sew up a wound in the interior of the nasal passages than to perform any other delicate intranasal operation, and any one who can perform, for instance, a submucous resection of the septum, will be able to use the intranasal suture.

The cases which I have operated upon were selected from the material of the clinic at Mt. Sinai Dispensary by the chief of the clinic, Dr. Emil Mayer, with whom I am associated there. Dr. Mayer was also kind enough to assist me himself at most of the operations, and to inspect all the cases during the course of the healing and subsequently thereto.

There were altogether 14 cases of hypertrophy of the inferior turbinate. In 4 of these cases, the hypertrophy was limited to the anterior end; in 4 cases to the anterior end and inferior border;

in one case to the inferior border alone; in 3 cases to the inferior border and posterior end; in 2 cases, anterior end, inferior border and posterior end were all hypertrophic and polypoid.

The operation consists of two stages: 1st, the excision of the hypertrophied tissue; 2nd, the suture of the wound. It is performed in the following manner:

After the use of cocaine and adrenalin an incision is made with a knife above, and another below, the hypertrophy, the two incisions meeting at a sharp angle in front and behind. The included mass is then dissected out with elevators and scissors. Enough of the bone is then removed with punch forceps to bring the edges of the wound together. In some of the cases the entire mass, including the bone, was removed at one stroke with strong scissors, but owing to the retraction of the mucous membrane it was necessary to remove an additional strip of the bone. As the bone is very rough, especially near its inferior border, it is difficult to separate the soft parts in a satisfactory manner. The available scissors and punch forceps are also too thick and clumsy so that this part of the operation is tedious and consumes the greater part of the time. When the wound has been properly prepared, the edges are brought together with sutures. For this purpose number 0 catgut is used, sterilized by boiling it in a supersaturated solution of ammonium sulphate as described by Dr. Elsberg.\* From 2 to 10 sutures were used, the average number being 5. The sutures were placed about one-fourth inch apart, beginning posteriorly and working forward. The nose was then packed with spunk impregnated with aristol powder.

The course of the healing was as follows: In a few of the cases there was oozing of blood-stained mucus through the dressing, but in none of the cases was there any hemorrhage. The packing was removed after 48 hours. As there was usually at this time some secretion, the patients were given a spray of Dobell's solution. When they returned on the following day, the secretion had disappeared, except a very slight amount in the immediate neighborhood of the sutures. On the fourth or fifth day the sutures were absorbed and their projecting ends discharged from the nose. On the sixth or seventh day all secretion had disappeared and the patients were discharged from treatment. In one case a fibrinous exudate, such as is occasionally seen after the use of adrenalin, appeared and remained for a week. That this exudate did not interfere with the healing was made evident when the patient presented herself on

\* *International Clinics*, Volume 1, Eleventh Series.

the ninth day with the nose perfectly free and the wound healed. In a few cases the edges of the wound were not perfectly coapted. In these cases there were small areas of granulation between the sutures which took a few days longer to heal, the longest being 14 days. Yet even in these cases, the amount of secretion after the third day was so small that it is not perceived by the patient, and caused no discomfort or inconvenience. Nearly all of the patients could be discharged before the expiration of one week; and when we compare this with the slow and troublesome after treatment following the ordinary turbinectomy we are forced to the conclusion that the older methods are crude and primitive, but that the careful excision of the diseased part, followed by suture of the wound and primary union, is a precise, exact and scientific method of operating, which is in strict accord with the best principles of modern surgical technic. When I have seen these patients return on the fifth, sixth or seventh day, without complications, without blood, crusts or secretion, with the wound entirely healed and the scar almost invisible, with the turbinate covered with normal mucous membrane, and apparently functioning in a normal manner, these results appeared to be so eminently satisfactory that I have hastened to make this preliminary communication, in order that I might demonstrate the instruments and the technic which I have devised for the purpose of intranasal suturing, hoping not only that I may be able in the near future to give a more detailed account of a better technic in the first stage of the operation as the result of a larger experience, but also that the experience of others may the sooner be of benefit to us all.

The instruments necessary to pass and tie an intranasal suture are three in number. A needle, to thrust the thread through the mucous membrane, a hook to grasp and withdraw the thread, and the suture closer. To these may be added a fourth, the crotch-forceps, to steady the mucous membrane during the passage of the needle.

In order to suture a wound in whatever position it may occupy in the nose, it is necessary to have needles which will pass a suture in any desired direction. For a horizontal wound the suture must be passed vertically; for a vertical wound, horizontally; for oblique wounds, at right angles to the wound. The needles are shown in Plate 1, Figs. 1 to 7. Fig. 7 shows a straight needle, Fig. 6 a needle bent backwards, similar to the needle used by Killian to suture the wound after the submucous resection of the septum. These needles pass the suture in a horizontal direction, i. e., they suture a vertical

wound. Figs. 1 and 2 show curved or half round needles placed at right angles to the shank. They pass the suture in a vertical direction and are used for horizontal wounds. Figs. 3 and 4 show half round needles placed at an angle of 45 degrees to the shank; they are used to pass an oblique suture. Fig. 5 shows a straight needle placed at right angles to the shank; it is particularly useful for what will presently be described as the indirect suture. All the needles have the eye close to the point. The curved needles have a deep groove on the convex side, the concave side being smooth; this arrangement is intended to keep the threads separated. In the operation under consideration at the present time, the wound is horizontal; hence only the half-round needles placed at right angles to the shank are used. The other needles are useful in other procedures in which suturing may be employed. I have performed similar operations upon the middle turbinated body and the ethmoid cells. I have also operated upon three cases of perforation of the septum, by making a flap of one mucous membrane, bringing it down and suturing it in place over the perforation in the other. One of these cases was only partially successful, the other two perforations were completely closed. These operations will be described in detail in a subsequent article.

The hook, Plate 1, Fig. 8, was the subject of special study. The requirements of an ideal hook are: It must grasp the thread as it comes from the eye of the needle quickly, but must not grasp both threads nor cut into the thread. The thread must not slip down along the shank of the hook, nor escape its grasp. The hook must rotate in its handle, so as to be placed in any desired position, to correspond to the needle. It was practically impossible to reconcile these requirements. The various forms of hooks experimented with are shown in Figs. 8 to 14, but the one finally selected as the best is the double crochet hook, Fig. 8.

The suture closer consists of a ring placed on the end of a long slender shank, Fig. 15. Where the shank joins the handle, there is a half sharp ridge of metal at right angles to the shank; just behind the ridge is a notch, the bottom of which is at the level of the center of the ridge. The use of these parts will be described later.

The crotch-forceps, Fig. 17, is a slender forceps, the blades of which end in a U-shaped crotch. With this forceps the mucous membrane is grasped, and the needle passed through it between the prongs of the crotch.

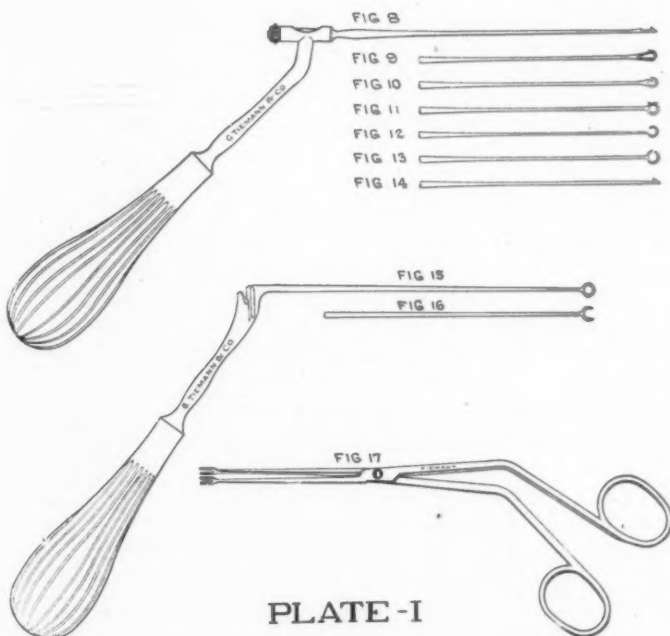
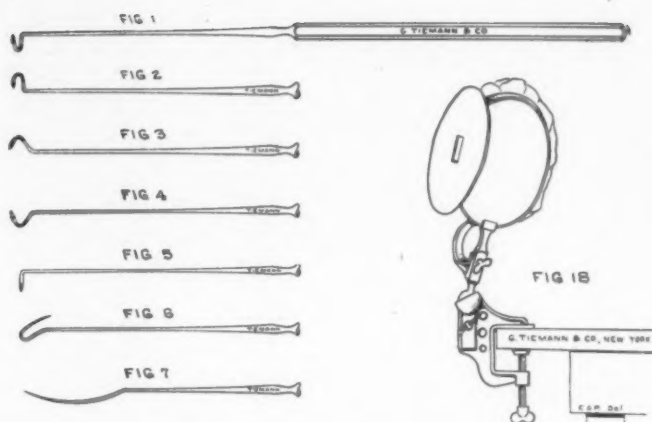
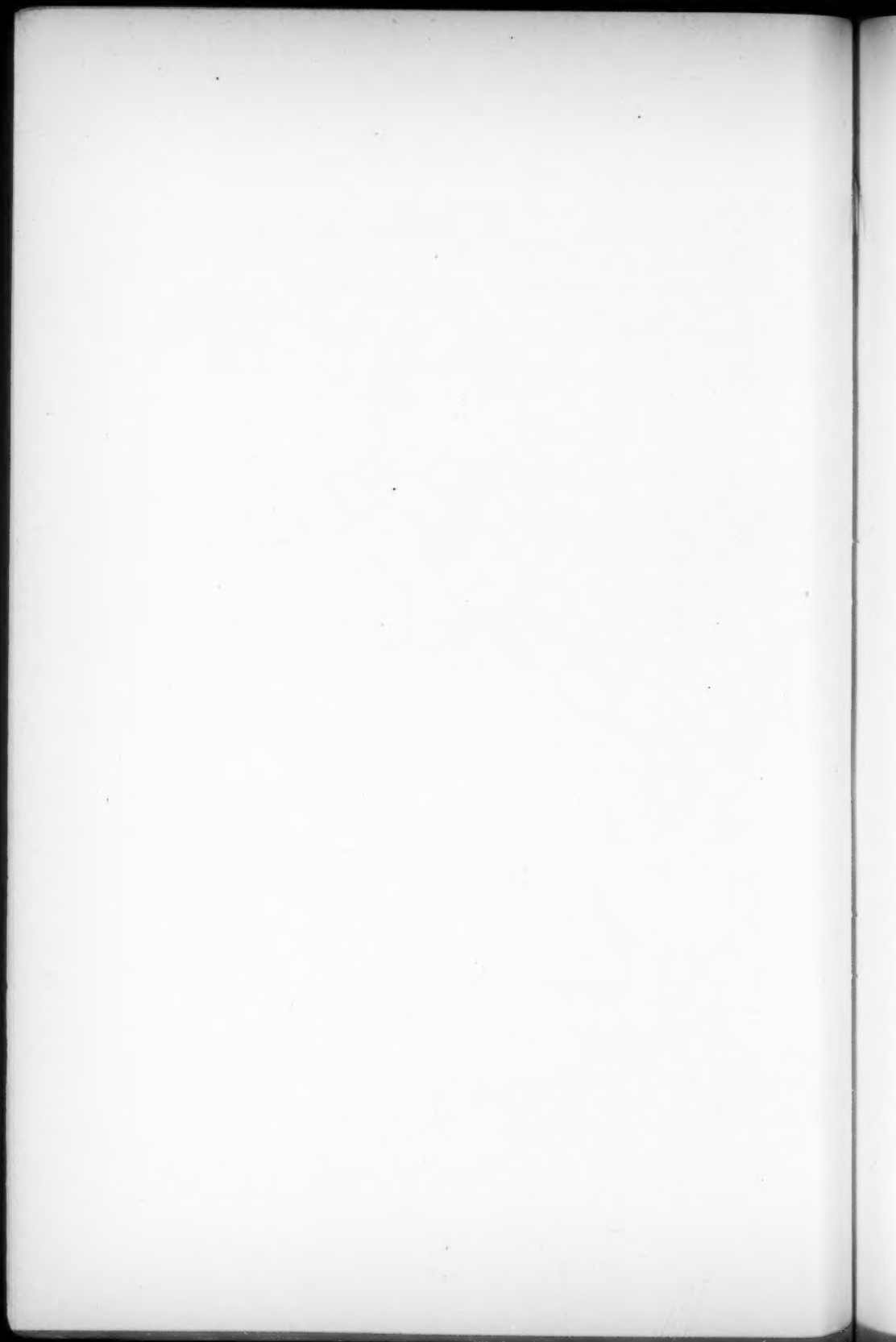


PLATE - I



To facilitate the study of the technic, the tying of the knots, etc., I have devised a small manikin, Fig. 18. This consists of a wooden frame in which a piece of gauze can be stretched. In front of this frame a circular plate of cardboard is fastened, which is perforated by an opening intended to correspond with the opening made by the self-retaining speculum. The whole is fastened to a table by means of a clamp with a ball and socket joint. The outline of the nasal interior may be drawn upon the gauze, or vertically or horizontally striped cloth may be used to study the various motions, the effects of perspective and foreshortening in the deeper parts of the nose, and to exercise the eye in the judgment of horizontal distances by the use of the accommodation, as is necessary in monocular vision.

*The introduction of the suture.* The needle is threaded with a suture about 18 inches in length. Just before using, it is held for a moment in sterilized water or carbolic solution, to soften the catgut. Whether the suture is passed from above downward or from below upwards, depends upon the condition of the flaps. It is generally best to pass the needle first through that flap which is the more movable, then bring the needle holding the mucous membrane up to the other flap, and then penetrate this flap. In this way the suture can be passed without the use of the crotch forceps. If, however, the flap through which the needle is first passed is bound down to the underlying tissues, it may be necessary to seize the other flap in the crotch forceps and bring it over the point of the needle. It is only in the last stitch or two that both flaps can be penetrated with one motion of the needle.

*Grasping the thread.* When the needle has been properly passed, the eye will project about  $1/16$  to  $1/8$  inch from the mucous membrane. If the two threads as they come from the eye of the needle are well separated, so that each can be distinctly seen, one of them can be seized with the hook without difficulty. Plate 2, Fig. 1. If one of the threads, however, has slipped out of the groove on the back of the needle, the two threads may lie side by side, and, owing to the blood or secretions, may stick to each other. To separate them, they are seized together in the hook and drawn down so as to make a double loop. If the assistant now draws gently upon one of the ends outside of the nose, one of these loops will straighten out, leaving the other distinct and separate. If the thread sticks to the side of the needle, it is best seized by using the side of the hook, which is specially designed for this purpose. The hook may be rotated

into the proper position by moving the pilot wheel at the end of its shank with the index finger of the hand holding the instrument.

*Withdrawing the needle.* As soon as the thread has been properly seized in the hook, the needle is withdrawn by rotating it backwards until it is free from the mucous membrane and withdrawing it from the nose. The hook during this time is kept close to the needle-puncture, to prevent the suture from tearing out. Fig. 2. If the assistant has kept the threads from becoming entangled, this is accomplished easily. These manipulations must be made continuously and the hook carefully watched during this part of the procedure, to avoid losing the loop.

*Withdrawing the hook.* As soon as the needle has been removed from the thread, the hook is withdrawn from the nose, bringing the loop of thread with it. One side of the loop is now drawn upon, so as to bring an end of the suture out of the nose. If the sutures are placed well back from the edge of the wound, and the mucous membrane is strong, the procedure may be facilitated by holding one end of the thread and allowing the other to run over the hook as it is withdrawn from the nose.

*Making the slip-knot.* When the suture has been successfully passed so that the thread passes through both edges of the wound and its two ends lie outside of the nose, without entanglement, a slip-knot is made as follows: The thread is adjusted so that about one-half of its length is outside of the nose on one side, the other end being correspondingly shorter. A simple overhand knot is now made near the middle of the thread and the short end threaded through the bight of this knot as shown in Fig. 3. The overhand knot is then closed until it binds the thread. We now have two ends coming from the slip-knot: one end may be distinguished as the knot-end, the other as the slip-end. When the overhand knot is drawn tight its bight will be seen as in Fig. 4 to stand crosswise, i. e., at right angles to the slip-end, and slip-end and knot-end come out of the knot on opposite sides of the cross piece, thus making a true slip-knot. If the end *a* Fig. 3 were passed through the overhand knot in the opposite direction, the two ends would come from the knot on the same side of the cross piece, and a granny slip-knot would have been made. A true slip-knot will bind tight when it closes down upon the tissues.

*Closing the slip-knot.* Having adjusted the slip-knot as shown in Fig. 4, it is brought up until it is near the nostril. The knot-end is now passed through the ring of the suture closer from the

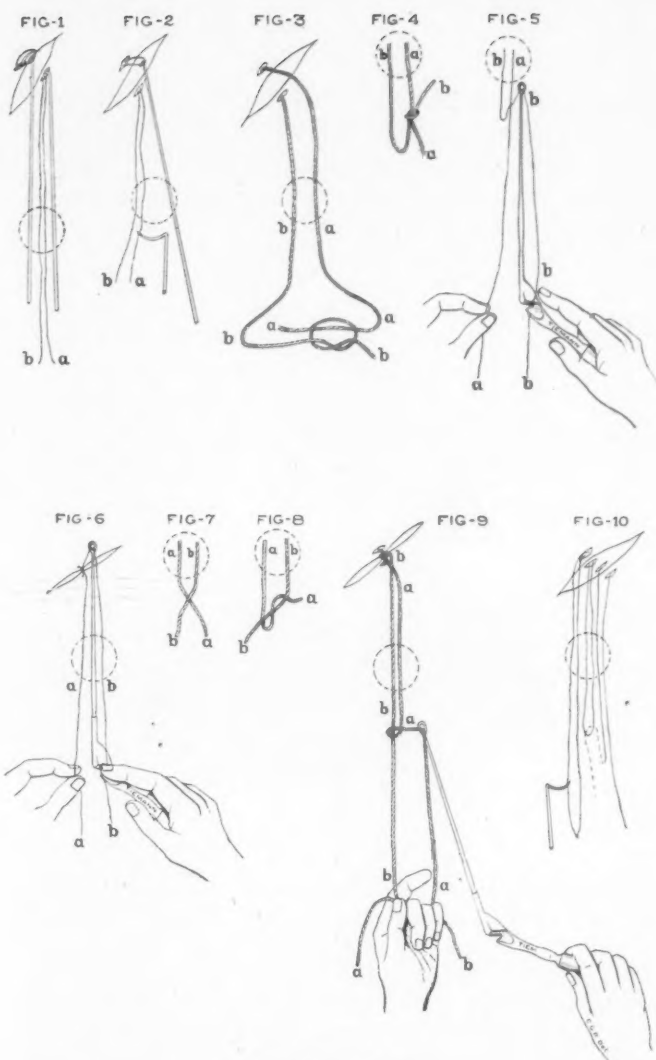
left to right, as shown in Fig. 5; it is laid across the ridge and into the notch, and, with the finger of the right hand (which holds the suture closer) pressing lightly upon the thread, the instrument is moved along the thread until the ring is within an eighth of an inch from the knot. The finger is now pressed firmly upon the thread as it crosses the ridge; the left hand holds the slip-end, *a*, and, in this position, the suture closer is advanced into the nose and the knot closed. As the slip-knot closes upon the tissues, the ring of the instrument passes the stitch-hole, Fig. 6, and the knot is closed as tightly as necessary.

*The safety knots.* In order to prevent the slip-knot from becoming loose, it is advisable to make a true surgical knot, consisting of two overhand knots, above the slip-knot. When the slip-knot has been tightened, the end *a*, which has been held in the left hand, is allowed to lie across the palmar surface of the left and from left to right; as the suture closer is withdrawn from the nose, the end *b* is laid across the left hand from right to left, on top of *a*, as shown in Fig. 7. The first overhand turn of the surgical knot is then made as in Fig. 8, and it is brought up near the nostril, care being taken not to confuse the two ends. The end *a*, which is now in the right hand, is threaded through the ring of the suture closer from left to right, the instrument brought up near the knot, and both ends allowed to hang free. By a dexterous motion of the left hand, which can be acquired after a little practice, both ends are caught in the left hand in the manner shown in Fig. 9. By making slight tension upon the end *b*, and allowing the end *a* to be just loose enough, the overhand turn falls into the position shown in Fig. 9, the ring of the suture closer being about  $\frac{1}{2}$  inch from the taut thread *b*. In this position the knot can be readily run up the taut thread. As the suture closer passes the slip-knot in the wound in the nose, this overhand turn lays itself neatly upon the slip-knot, and, by making tension upon both ends with the left hand, and with the suture closer, the knot is made as tight as is necessary. As the suture closer is withdrawn from the nose, the second overhand turn of the surgical knot is made by bringing the end *a* under the end *b*, making the turn in a manner the reverse of that shown in Figs. 7 and 8, bringing the end *b* to the right and through the suture closer. This turn is then tightened in the same manner as the first turn. In this way a true surgical knot is tied on the top of the slip-knot. The ends of the catgut are cut off close to the knot by means of any suitable pair of scissors.

*The indirect suture.* It occasionally happens that the suture cuts through one lip of the wound, or that the edges of the wound cannot be readily punctured with the needle at the same time, so that the suture is passed through one edge of the wound only. In such cases both ends of the thread are allowed to hang down from the nostril. The companion needle to the one used for this suture is now threaded with No. 1 braided silk, making a loop 18 inches long, and tying its ends together. This silk loop is passed through the other edge of the wound, and one end of the catgut is threaded through it, care being taken to select the proper end. The procedure is illustrated in Fig. 10. The silk thread is now withdrawn, carrying the catgut with it through the edge of the wound. If the mucous membrane is delicate, the crotch forceps is held against the needle-puncture, to act as a pulley over which the silk is drawn. The slip-knot and safety knots are now tied in the usual manner.

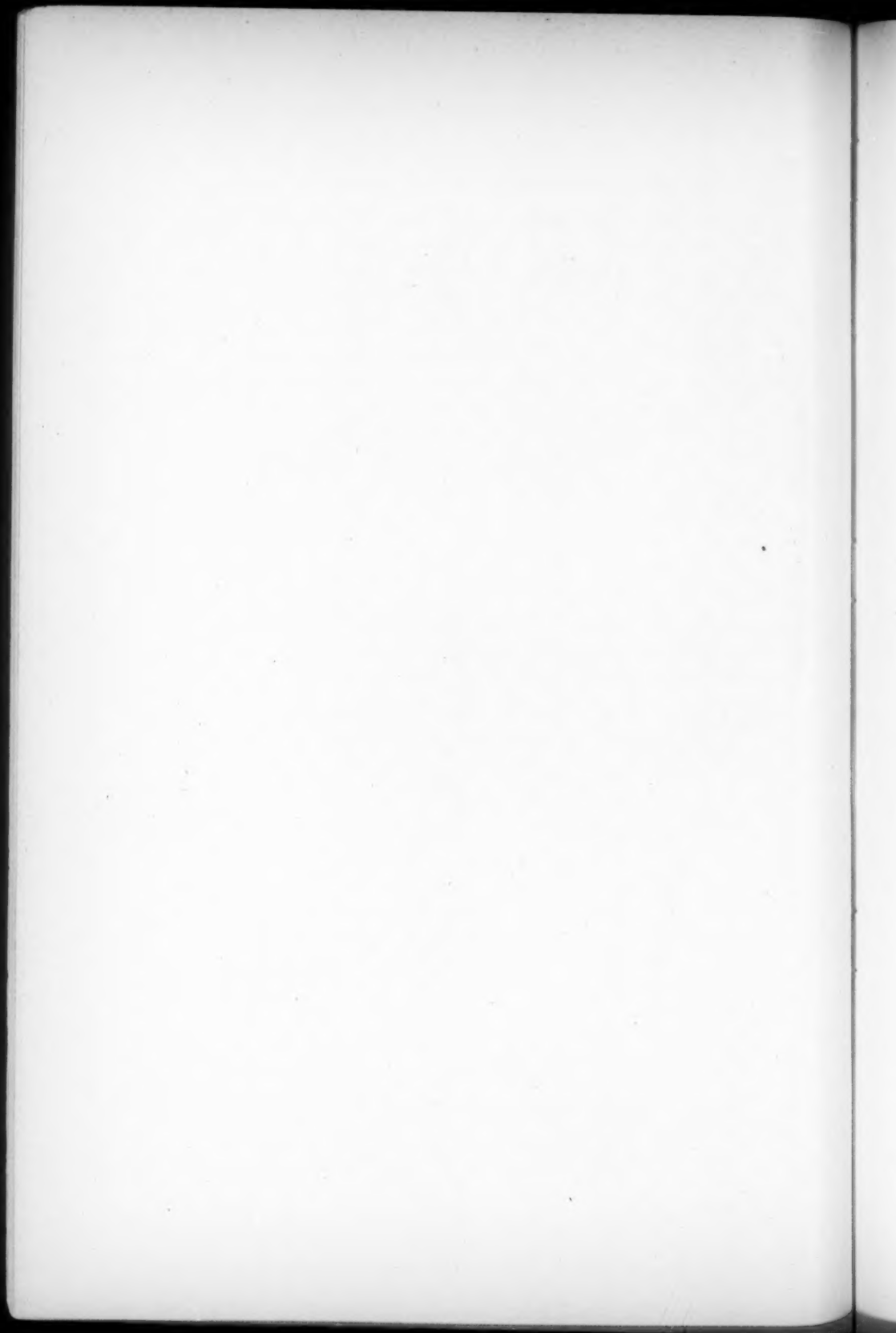
It is always difficult to describe the handling of cordage, and tedious to follow the descriptions; but if these knots are tied upon the little manikin above described, it will be found that the manipulations follow each other in a natural and easy manner. The sensation imparted to the finger which holds the thread by pressing it against the ridge on the suture closer is very similar to the sensation imparted by the thread in tying ordinary knots, and the whole procedure requires no greater adaptability or skill than any other surgical manipulation.

616 Madison Avenue.



## PLATE - II

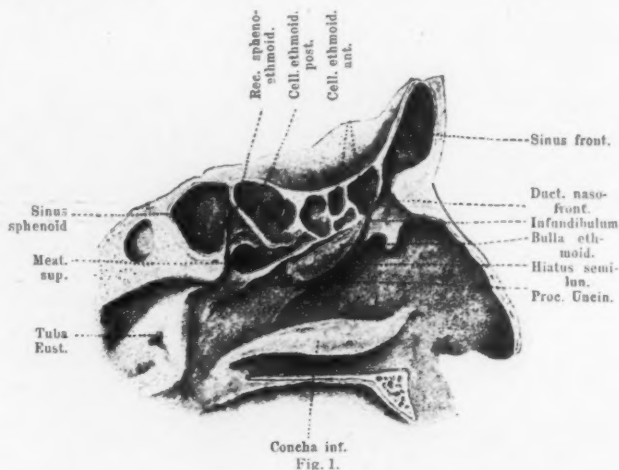
The dotted circle denotes the opening of the nostril.



## EXTERNAL OR INTERNAL OPERATION FOR SUPPURATION OF THE ACCESSORY NASAL SINUSES.\*

BY MAX HALLE, M.D., BERLIN, GERMANY.

The extraordinary advances made during recent years in external operations for suppuration of the accessory nasal sinuses have led gradually to the employment of this measure in the therapeutics of chronic empyema in ever-increasing frequency, while a large number of rhinologists with surgical training have come to neglect more and more the internal treatment of such cases.



Permit me to lay before you my view of the matter, based upon eight years of work, and an experience gained from hundreds of cases of empyema.

Let us recapitulate briefly the anatomical conditions. (Fig. 1.) We recall that the hiatus semilunaris lies in the middle meatus. It contains, in the rear portion, the normal opening or ostium of the antrum of Highmore, in front of this the ostia of the anterior cells of the ethmoid bone, and still farther forward, in the infundibulum, those of the foremost ethmoidal cells and of the frontal sinus. The posterior cells of the ethmoid bone open into the superior nasal

\* Read before the Berlin Medical Society.

meatus, as does also the ostium of the sphenoid sinus. Finally, in the naso-pharyngeal space, we find the Eustachian tube, serving as the ostium of the middle ear, which, I think, may be considered an accessory nasal cavity in a wider sense; for the ear is subject to exactly the same conditions as all other accessory nasal cavities, except that it has an elongated opening, and its lateral wall is membranous, not osseous.

We will call to mind that sinus empyema may be of dental or nasal origin, caused either by diseased teeth or by coryza, influenza, or infectious diseases. The therapeutics of empyema of dental origin, which can affect only the maxillary antrum, consists of the extraction of the infected tooth and subsequent treatment of the antrum, which will be discussed later. Empyema of nasal origin either heals spontaneously or becomes chronic. We will now consider the important question of how the cure of acute empyema is effected.

The diagnosis of empyema is arrived at chiefly by means of the pus which flows from the sinuses. It is a question whether we must imagine that the discharge from the maxillary sinus, for instance, is caused by the filling up of the cavity, so that the pus runs over necessarily, or on bending the head forwards, sideways, or backwards. In a number of cases it may be so, but it is hardly the rule. Opposed to it is the fact that if a cavity from which pus has been flowing freely, be tapped, very often no more than a very few drops of pus are found; seldom, at any rate, a quantity corresponding to the capacity of the cavity. Now, it might be that the pus is forced out by reason of the highly inflamed, greatly swollen mucous membrane. But in numerous cases of chronic empyema there is found on tapping only a moderately swollen mucous membrane, which does not greatly reduce the capacity of the cavity. There must, then, be another explanation of this phenomenon, and to my thinking it is to be found in respiration.

The passing of air in the acts of inspiration and expiration exerts, in accordance with purely physical laws, a continuous negative pressure upon the cavities. This negative pressure is increased with stronger inspiration and expiration, and especially through blowing the nose; so much so that by a strong blow pus in the liquid state can be expelled easily from the cavity and brought to the surface. The strength of the negative pressure can be demonstrated easily by having a patient whose antrum has been tapped through the alveolus take a deep breath. It can then be seen with what ease saliva or particles of food will pass into the antrum. In

a like manner, it may be possible to explain the observation made by Hartmann, that with energetic use of the Politzer bag pus will flow from the sinuses, especially if the ostia have been previously cocainized, and if the pus is thin. That air is forced into the cavities, and pus forced out in turn, is hardly a satisfactory explanation, for the air can escape with much greater ease through the choanae into the pharynx, or through the other side of the nose, and would even easily force open a closed velum palati, which, however, should be avoided in this case because of the danger of infecting the ear. On the other hand, it is quite comprehensible that a current of air blowing forcibly past the sinuses would suck out their contents.

The negative pressure of the air of respiration has, then, a permanently aspirating effect on the sinuses. This air also acts in another way. It is known that the air is saturated with moisture in the nose. It also draws moisture out of the more saturated air of the sinus, as, by diffusion, nature establishes an equal distribution of moisture in the air contained in both sinus and nose. Thus respiration serves to dry the sinus. At the same time, the well-known high disinfecting power of dry air is brought into play, so that we have these three agencies for the cure of empyema: (a) sucking out of the pus; (b) drying out of the sinus and shrinking of the swollen mucous membrane; (c) disinfection. These factors will operate especially well in a case where the respired air can pass through the nose without obstruction; while extended swellings, deviations, spurs, polypi, etc., in the nose will cause a less efficient respiration, and, therefore, less favorable results. In point of fact, empyema is found most frequently where respiration is thus interfered with, and in such cases generally on the less open side; and on the other hand, empyema is cured most quickly and easily where the nose permits of unhindered respiration. Taking all this into consideration, the spontaneous healing of acute empyema is quite comprehensible; and, in fact, a rapid and complete cure has been noted in a large number of cases under the above-mentioned favorable conditions.

It is apparent that we ought to take notice of the curative efforts of nature, and work along the same lines in the therapy of chronic empyema. The question is only: Can empyema of a chronic nature, that is, of at least half a year's duration, be cured without radical curettage of the diseased cavities? At this point, I might remind you of the generally known fact that chronic empyema of the middle ear, which, as explained above, may in a cer-

tain sense also be regarded as an accessory nasal cavity, may heal of itself after the removal of adenoid tumors, enlargements of the nasal mucous membrane, etc. The compression of the Eustachian tube and the inflammatory swellings disappear gradually, and suppurations of the ear which until then had defied all local therapeutics are often seen to heal in a surprisingly short time. The middle ear, however, is placed under very unfavorable conditions in this respect, as the numerous recesses, bone-cells, pockets and folds, formed by the ossicles and their ligaments, by nerves and vessels in the small space of the middle ear, must render the process of healing extraordinarily difficult.

We know, moreover, that chronic empyema may be cured if treated by means of continued irrigations through the alveolus. Therefore, a considerable degree of pathological change in the mucous membranes must be capable of recovery under favorable conditions.

If this in no wise rare possibility be conceded, we must ask ourselves whether the therapeutic methods heretofore in use create the most suitable conditions for healing.

#### MAXILLARY SINUS.

Let us start with the antrum of Highmore, which is the most frequently diseased cavity, and placed under the most favorable conditions. Here the attempt was made, at first, to effect a cure by boring through the alveolus (Cooper's operation), and long-continued irrigation. This method has the advantage that the cavity is easily accessible, and can be conveniently treated by the patient himself. It has also been considered of great importance that the cavity have an opening at the lowest point, as the pus can then flow off most easily. This, however, is the case only as long as the opening in the alveolus is unobstructed, that is, during the irrigation; at other times the aperture is kept closed by means of a metallic obturator, or the caoutchouc obturator specified by Herzfeld. And now we have again a cavity closed on all sides, and with the excretory duct at the highest point. As far as the cavity is concerned, it is absolutely of no importance whether the irrigation proceeds from the highest or the lowest point. It cannot be a matter of indifference, however, whether communication with the mouth is established, from where on account of the continued negative pressure of nasal respiration an unceasing, if only capillary, flow of liquid must be drawn into the cavity alongside the obturator. Moreover, the obturator itself must produce constant irrita-

tion, as its antral end is likely to be surrounded with numerous granulations which, on their part, cause or at least favor further secretion. And, lastly, the one or two irrigations daily, even with physiological salt solution, act upon the mucous membranes as a continually recurring stimulus for secretion. We have long since renounced frequent irrigation in the surgical treatment of all other cavities—I will remind you here only of empyema in the pleura—because we have come to the conclusion that, in general, irrigations are not favorable to healing. This measure is resorted to only when retention of pus is suspected. What is recognized to be of but little value in all branches of surgery, cannot be retained as justified in this field only. Again, continual drainage, the unobstructed flowing off of pus which is rightly insisted on in surgical practice, is on the one hand in no wise guaranteed by making an opening in the aveolus; on the other hand, the drying out and disinfection of the mucous membranes through respiration, which we consider an important factor in the process of healing, is permanently hindered. The only advantage which the alveolar method offers, the self-treatment by the patient, can be obtained as well or better in another way, as we will see later; and for these reasons I personally have refrained from using this method of operation for years, and do not think it commendable.

The intervention by way of the canine fossa is that method which makes possible a full survey of the cavity and a radical extraction of the diseased mucous membrane. In this way, tumors, sequestra, etc., can be diagnosed and removed. As a radical operation, therefore, this method will always be of value, and none other will be able to replace it. In other respects, however, it has all the disadvantages of the alveolar method in a higher degree. The opening into the mouth is very much wider, its closing up by means of obturators, cotton, etc., much less feasible; a continual irritation of the diseased cavity from saliva, mouth washes, particles of food, etc., is unavoidable. Various efforts have been made to meet these objectionable features; it has been attempted to line the entire antrum with epithelium; but until the present no altogether satisfactory results have been attained.

The operation of opening into the antrum through the lower nasal meatus, which was introduced by Mikulicz, and further developed by Krause-Friedländer, makes it possible to irrigate and treat the cavity from very nearly the lowest point. This method also permits the continuous drainage of pus, and, according to Hajek, this favorable effect is produced, that the mucous mem-

brane around the ostium shrinks considerably soon after the first irrigation, and thus facilitates a free discharge of pus by this passage. That the opening is not at the lowest point is of no consequence, as again the effects of suction must be taken into consideration. If the air can lift the pus up to the considerable height of the natural opening, it can surely do so more easily to the gap in the lower meatus.

This method, however, has the disadvantages that the permanent opening is very small, that the *Bone of nasal mucosa* periosteum, which is only

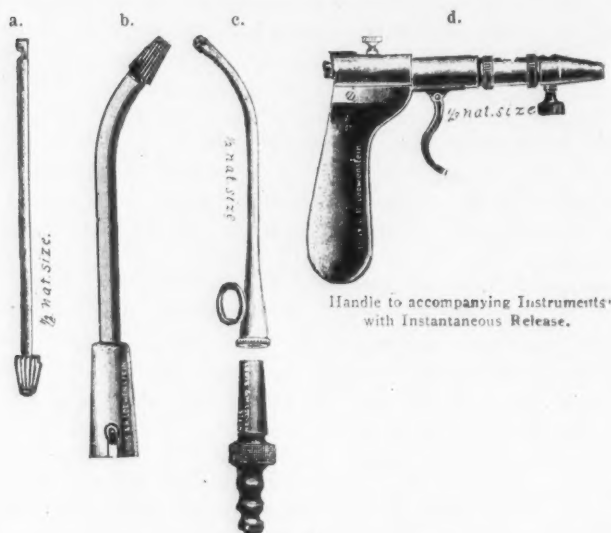


Fig. 2.

pierced, easily closes up again almost like a *sail* ~~safety~~ valve, that the after-treatment is rather painful, and that the patient requires the attention of the doctor for *long* ~~some~~ time. However, the results obtained are on the whole satisfactory. I have seen numerous patients suffering from chronic empyema of the antrum of Highmore healed completely by this method. Still, the difficulties of treatment and the defectiveness of the permanent drainage made a *more* effective opening into the antrum maxillare seem desirable, and different authors have made numerous attempts to accomplish this. For several years, I myself have been using a trephine-drill

(Fig. 2a), an instrument which has a trephine point with a drill back of it. It is usually straight, but if the medial wall of the cavity bulges to the side <sup>and</sup> back I use a curved instrument (Fig. 2b). With this an opening of any desired size can easily be made. When the instrument has pierced the wall, I take a pear-shaped, blunt-pointed drill (see frontal sinus later; Fig. 3d), by means of which I can scrape down the medial wall in most cases to the bottom of the cavity. The after-treatment is carried out by means of a little tube bent like a catheter (Fig. 2c).

This operation offers the following advantages: Continuous mechanical drainage of pus is guaranteed, the suction of the air, the desiccation and disinfection of the cavity can take place without hindrance. Also, the patient can easily syringe and treat himself, if it is desired. The opening must not be made too small, as in that case it tends to become rapidly smaller and to close up again. The lower turbinated bone I leave intact as long as it appears to be normal. If the lower edge is in the way of the drill, I raise it well by means of a dressing forceps, so that the field of operation is left free. Thus the physiological structure of the nose is preserved as nearly as possible, and more favorable conditions for healing are secured. It is naturally of the greatest importance that all considerable deformities of the nose, such as deviations, crests, polypi, hypertrophies of the turbinated bones, etc., be carefully removed, or else the effective action of respiration cannot be brought into play. In spite of the fact that numerous authors have pointed this out, it cannot be called to mind often enough, for experience shows that again and again this principal demand is not regarded.

That it must indeed be the continued suction of the air which draws out the pus, is proved also by the fact that in spite of the large opening in the lower meatus, out of which the matter could easily be discharged, it is seen to flow as well out of the natural opening, by which the air is believed to pass with greatest force. Conversely, this phenomenon is an evidence that at this point there must be the strongest current of air. Though, of course, it must be noted that in the action of blowing the nose, the air, because of the large artificial opening, is easily forced into the cavity, and might eject the pus in this manner.

The after-treatment consists of infrequent irrigations (every 8-14 days), blowing through of dry air by means of a thick catheter-shaped tube, and the occasional dropping in of alcohol, protargol, or argyrol. The insufflation of powder I have long since completely discarded.

My experience with this method is most satisfactory. A large percentage of the patients is permanently cured. Those who still have a slight amount of secretion generally decline further interference. But even in cases where, on account of the persistence of a copious discharge, I have resorted to an operation by way of the fossa canina, I have often not been able to find anything more than a few granulations, and after their removal the suppuration did not decrease in the least. In a few cases, where both cavities were diseased, I have treated one only from the nose, the other because of long continuing suppuration from the fossa canina and the nose, but have not accomplished much more with the latter method. That others do not have extraordinarily favorable results by operating from the fossa canina, would seem to be proved by the patients I have seen in my work as assistant and student in many other dispensaries; one proof among others being also the work of Gerber, who now approaches the antrum almost entirely by way of the nose, though, in point of fact, from the middle meatus. This, to me, does not seem practical; in the first place, because the hiatus semilunaris is situated very close to the orbit, which might very easily be injured during an operation, and, secondly, because the drainage of pus is much more difficult from there, and the treatment by the patient himself, which is often desirable and even necessary, cannot well be managed. In the rare cases where I have made an opening by way of the middle meatus, my experience was less satisfactory than with the broader opening from the lower meatus. At any rate, Gerber lays great stress upon intranasal therapeutics in empyema of the antrum, and he has gotten away more and more from the method of Küster, which he formerly used.

I have never met with considerable difficulties in the above described operation. If the operator exercises some degree of care, and if the opening, in accordance with the object in view, be made near the root of the lower turbinated bone and then extended toward the bottom, only extremely rare anomalies should cause any technical difficulties worth mentioning.

From the large opening which has been established, the operator can survey the cavity in part; and eventually, after the insertion of a long tube, he can form a reasonably certain opinion of the pathological changes in the mucous membrane.

If the intranasal method produces good results under the very unfavorable conditions of the antrum of Highmore, it must offer a good working basis for the therapy of other cavities as well.

## SPHENOID SINUS.

Let us next consider the sphenoid cavity, whose ostium is likewise situated rather high up, mostly about on the border between the upper and middle third. Here it is easy, after the removal of the posterior portion of the middle turbinated bone, to attack the anterior wall of the cavity, to establish a more or less large opening, which is kept open according to need with tampons and trichloroacetic acid, and by means of which the pus can be drawn off without difficulty, as from the antrum. If the pathological changes are of a high degree, so that the ordinary opening is not sufficient, the whole anterior wall can be removed, and it must only be borne in mind that because of the proximity of the hypophysis cerebri to the upper wall, and the sinus cavernous to the lateral wall, great carefulness must be exercised at these places. For this operation, I use a plain chisel, Cholewa's, and a hammer, and for the removal of the lowest and very hard portion of the anterior wall, a blunt-pointed drill (compare the operation on the frontal sinus later; Fig. 3c), by means of which the cavity can easily be laid bare to the bottom. If it is thought desirable to undertake the removal of the mucous membrane and the obliteration of the cavity, this is now possible without any considerable difficulty.

## ETHMOID SINUS.

Empyema of the cells of the ethmoid bone, likewise, rarely offers extreme difficulties for intranasal operation. Of course, on account of the numerous separate cavities, an extensive opening-up or removal of the separate cells, and the creation of a single large cavity, will have to be undertaken, to provide conditions favorable to a perfect cure. After that, however, it will generally be possible, in one or several treatments, to open up all or nearly all of the diseased cells also from within, and to effect a cure. Only the most anterior cells are sometimes more difficult to reach, and we will consider their therapy when we come to speak of the treatment of empyema of the frontal sinus.

## FRONTAL SINUS.

The only cavity which so far has seemed rather inaccessible to internal therapy is the frontal sinus. To be sure, a number of attempts have been made to approach this cavity also by way of the nose. I remind you of the attempts of Schäfer to provide an outlet for the pus by forcing a heavy probe up the front of the nose; also of the work of Hajek and Grünwald and others, who have

removed the anterior portion of the middle turbinated bone, probed the cavity, and irrigated it by introducing a canula. Worthy of notice are the interesting experiments of Scheier and Spiess, who have made use of the Roentgen rays for investigating and safeguarding the procedure of opening the sinus by means of the drill. However, a fairly reliable method of conveniently exposing the frontal sinus from the interior has not been found. Ingals, indeed, has announced a way to make a broad opening into the cavity from the nose. He introduces a probe into the frontal sinus, slides a flexible drill upon the probe and, pulling the probe forcibly to the front, he removes the anterior wall and the floor of the sinus. With this method the following anatomical conditions must be considered: (See Figs. 1 and 4)

The drainage duct of the frontal sinus borders toward the back directly or almost directly on the tabula interna of the frontal bone, toward the side directly or nearly so on the lamina papyracea of the ethmoid bone. In front of the duct a large spina naso-frontalis interna is seen to project, which forms part of the floor of the frontal sinus. This spina naso-frontalis could be taken away without danger, and a broad duct procured, if it were possible to remove only this spine with an instrument, without injuring the tabula interna and the lamina papyracea, and thus endangering the dura and the orbit.

In the first place, it is a question whether the naso-frontal duct can be probed in a living person. That this is possible in many cases, especially after the removal of the anterior portion of the middle turbinate, would seem to be sufficiently proved. In cases of chronic empyema, where the pus has been active for some time, the excretory duct has generally become large enough to admit a probe without difficulty.

Regarding the more exact anatomical relations and the technique of the probe, I might at this point refer to the excellent dissertations of Hajek. I will only recapitulate briefly that the naso-frontal duct generally opens into the hiatus semilunaris or medially to it. If several ducts are to be explored in front, it will be found that the duct from the hiatus semilunaris leads usually into one of the anterior ethmoidal cells, and the one medial to it into the frontal sinus. Without desiring to enter more closely at this point into the difficulties of differential diagnosis, it is my belief that in supposed chronic empyema of the frontal sinus it is possible in the greater number of cases to introduce a probe into the cavity of the frontal bone without difficulty by following the outflow of pus. If,

however, a flexible drill is slipped onto the probe, this drill, even though pulled ever so strongly to the front, is very likely—in view of the anatomical conditions as above set forth—to injure the tabula interna, and by so doing to endanger the life of the patient; and for this reason I consider Ingal's method too dangerous to be recommended.

Myles's method might be mentioned. He proposes to remove the floor of the frontal cavity from the cells of the ethmoid bone by means of a hook-shaped chisel with a sharp lower edge. But this, too, seems to offer no guarantee whatever, as is easily apparent from a consideration of the anatomical relations. I have thought, therefore, that another course should be taken.



Fig. 3.

I introduce a probe as high as possible into the frontal cavity. Over the probe, I slide a protector of soft, flexible metal somewhat in the manner that Stacke guides his protector into the attic, which adjusts itself to the tabula interna posteriorly and to the orbit laterally (Fig. 3a). After that, I remove the probe. If I now advance with a bore-drill worked by electricity (Fig. 3b) immediately alongside of this protector in a forward and upward direction, taking care to keep always close to the protector (Fig. 4), I can go upward to the front and center without any danger at all, and open the floor of the cavity, which is formed by the spina naso-frontalis, to such an extent that I obtain an opening sufficiently large to admit a drill with a blunted point (Fig. 3c). The

<sup>1</sup> The instrument is to be always pressed firmly to the front.

sharp instrument is to be used only up to this time! When this is achieved, I can easily and, because of the carefully rounded, polished point of the drill, without danger to the tabula interna, enlarge the opening sufficiently to introduce into the cavity a



Fig. 4.

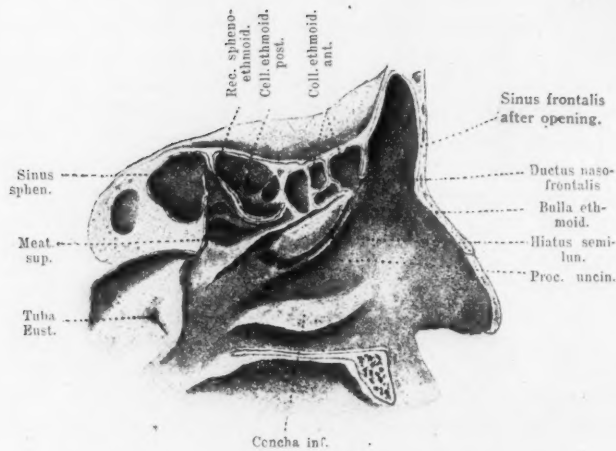


Fig. 5.

pear-shaped drill, whose thickened portion is carefully rounded off and polished. With this instrument, no dangerous injuries can be caused, provided the least care is taken. The entire floor can be drilled away with it, and so large a part of the tabula externa

ossis frontalis in a downward direction that the instrument can be felt from without, and that the opening of the frontal cavity towards the nose becomes almost as large as the distance of the nasal base from the tabula interna. Of course, it is necessary to take the precaution that the assistant pushes his finger well into the orbit, so that he can control the head of the instruments and prevent the drill from going too far to the front or side. If the cocaineization is done with care, and plenty of adrenalin used, the operation can be performed practically without pain and under constant control of the eye; *and it must be performed under constant control of the eye.* On no account should the operator work in the dark, forcing the drill blindly upward, but he must be able to overlook the field of operation closely at all times. In this way, the cavity can be opened to such an extent that it is possible to gain a complete survey of the mucous membrane and those lateral portions of the frontal cavity that are at all within the reach of the eye, so that the operator can acquaint himself sufficiently with the condition of the mucous membrane, the formation of polypi, etc., and get some information that might be of value in case an external operation should be required later. It is also quite practicable, if necessary, to reach and remove diseased mucous membrane, granulations, etc., at quite a distance from the operative opening by means of flexible curettes and sharp spoons. With suitable chisels (Fig. 3e), small, troublesome bony protuberances can easily be removed.

I have demonstrated this operation on numerous preparations, a number of which I am bringing before you to prove how unexpectedly large this opening can be made. In fact, by having the tabula interna securely in sight, all the ethmoid cells to the sphenoid cavity can be conveniently and safely evacuated by using double curettes, etc. (Fig. 6, which has been made from a preparation). On living persons, I have performed this operation so far twelve times in ten cases, that is, twice on both sides, seven of which I present to you today; the others could not be here either because of the distance or other irrelevant reasons. I have never experienced any difficulties worth mentioning in this operation. The dispensary patients generally come back to the dispensary the next day with only moderate, if any, edema of the eyelid or of the skin of the nose. The attendant pains are rarely considerable. As you see, the introduction of a very thick canula without the use of any kind of a speculum can be accomplished easily on all patients. Most of the patients can apply the canula themselves, if

necessary. The mucous membrane is destroyed only to a moderate degree, and besides, since very smooth walls are left by this operation, the granulation and epidermization can be obtained without great difficulty. To keep the opening continuously patent, I pack at first with isoform gauze, and use alcohol, protargol or nitrate of silver solutions to retard granulation and promote the formation of epithelium. Later I let the patient introduce a thick canula formed like an antrum canula, several times a day. Since such wide openings can be made, I have not found it necessary, so far, to establish continuous drainage; and have refrained from doing so also because of the irritation to the mucous membrane. But this can easily be done, if desirable.

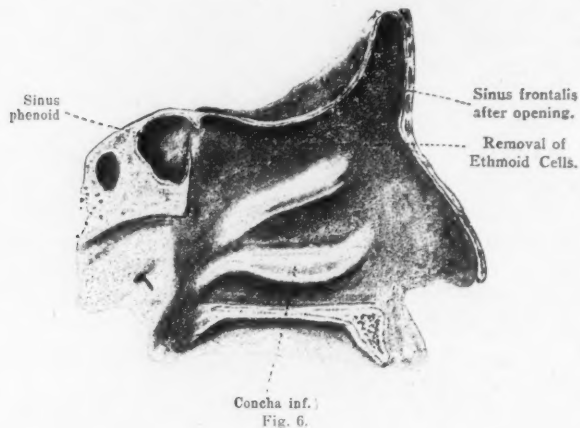


Fig. 6.

This operation also involves the foremost ethmoid cells, which for the greatest part are being removed as well. If the duct from which the pus flows does not lead, as was supposed, into the frontal sinus, but into a large anterior ethmoid cell, it is no calamity if this empyema of the anterior ethmoid cell is opened up during the operation; and from this point the probably diseased frontal cavity can then be reached. It is to be noted as the most important factor that with this method the operator must always work *in front of* the tabula interna, which is covered by the protector, and not advance too far to the side. If the operator advances always closely alongside of the protector and in the direction of its position, then it is quite possible, in rare cases, that he may reach an anterior ethmoid cell instead of the frontal sinus; danger to the

tabula interna, however, is excluded. But if the probe, and then the protector, advances upward and forward  $2\frac{1}{2}$  to 3 cm. or more from the infundibulum, they must have come to the frontal sinus or to a large anterior ethmoid cell.<sup>2</sup>

Of great importance in judging the proposed method of operation is the difficulty of making the diagnosis. I admit that it is often extraordinarily hard to decide whether it is a case of empyema of the frontal sinus or of the foremost ethmoid cells. But this difficulty is of like significance in external operations, and we must concede that such operations are often undertaken without sufficient reason for this course being found afterwards in the pathologico-anatomical conditions of the frontal sinus. Therefore, I see here no difference between external and internal intervention, except that in the latter procedure the external cicatrix is prevented. However, by carefully observing the origin of the pus and examining the patient at different times, the empyema can be located with a fair amount of certainty, and mistaken diagnosis avoided as much as possible.

The indication for internal operations upon the accessory nasal cavities is given in all cases of chronic empyema. The size of the opening, the more or less radical procedure is determined by the difficulty of the case, and the pathologico-anatomical changes; and the question is simply: when to abandon the internal method and to choose an external operation.

When, in empyema of the superior maxillary sinus, the cause in the shape of a diseased tooth is removed, treatment from the alveolus can be undertaken which, in a purely dental empyema, may lead to the desired results. However, in case of prolonged suppuration I would always advise opening the cavity from the lower nasal meatus and closing the alveolar opening.

If suppuration of the antrum in connection with nasal empyema continue a long time, notwithstanding the opening from the lower nasal meatus and the removal of all impediments to respiration; or, if, after several weeks' treatment, the suppuration does not abate to any extent, the indication is, sooner or later, that Küster's operation should be performed, the cavity examined for tumors, sequestra, etc., and any considerable pathological changes removed. After that, however, it seems to me better to close up the cavity again, and to conduct further treatment from the nose, unless the conditions are such that it is desirable to remove the entire mucous

<sup>2</sup> Care must be taken not to press the drills backward too forcibly against the protector, which, being made of copper, might be pierced, with danger to the tabula interna.

membrane and to let the cavity heal by granulation, or, as Lücke proposes, to widen the opening into the lower nasal meatus, and, after the opening from the fossa canina is closed, to remove the tampon from there.

External operation in empyema of the ethmoid and frontal cavities is, of course, strongly indicated when life is endangered, when there is a rupture into the orbit or to the exterior, and in case of threatening cerebral complications. But here, also, the indication is to be accepted with some caution. Numerous authors report complete recovery by the use of internal therapy without the proposed ample enlargement of the sinus ducts, even when pronounced edema of the eyelids and of the skin covering the nose and forehead has existed, accompanied by most excessive headache and apparently most threatening cerebral symptoms. At any rate, the internal operation may be attempted in such cases unless it is feared that the tabula interna of the frontal bone, or those portions of the pars orbitaria which form the base of the skull, are already perforated or extremely thin. If, later on, the external operation becomes necessary, nothing has been lost. On the contrary, the broad exposure of the ethmoid cells from within, the convenient drainage established by opening the frontal sinus into the nose, the consequent shrinking of the mucous membranes and the reduction of the inflammation will have created much more favorable conditions for the operation. I believe, therefore, that I am right in advising first the internal operation in nearly all cases, and in recommending the external operation only when such a course is strongly indicated, which every operator will decide for himself. For my part, I have always taken the course of advocating a radical method only when I was sure that I would have submitted to a radical operation myself under the same circumstances. With regard to the frontal sinus, a clear indication is given if in severe illness the ductus naso-frontalis cannot be probed with certainty.

Now, it may happen that a very large ethmoid cell is situated in front of the sinus frontalis proper, which may be very narrow, and forced to the front and upward, so that the supposed frontal sinus operation does not at first reach the frontal cavity at all. But, in the first place, such cases are very rare; and in the second place, it is hardly to be assumed that the frontal sinus should be diseased, and the large ethmoid cell below, which is so much more open to infection, should have remained sound. Besides, the same difficulty is encountered in the external operation.

Septa in the frontal sinus, the sphenoid cavity, or the antrum, need be taken into consideration only when other indications for radical intervention are present as well. If we recognize the effect of the air in respiration as an important therapeutic factor, then, I believe, it also affects cavities that are divided by septa (compare the middle ear); and in the case of the antrum of Highmore even a cavity which may possibly be double is generally opened up sufficiently through the large established aperture to make a favorable result possible.

The internal operations in empyema of the upper maxillary, the sphenoid, and the ethmoid cavities that I have been observing for years, have met with success throughout. The percentage of cures is extraordinarily high. Almost all cases improve so much that they are without any considerable distress, and generally do not want to subject themselves to radical measures. Even though in a number of cases an insignificant amount of discharge remains, it does not involve any danger worth considering because of the broad convenient passage established for the discharge. Besides, we know how comparatively rare are deaths on account of neglected empyema. On the other hand, there is very often a more or less copious discharge after external operations.

That in a great many cases the internal operation must have very considerable advantages over the external intervention is proved also by a large number of patients that apply for treatment with openings made from the canine fossa and the alveolus, who were not cured in spite of treatment extending over several years, in some cases ten or fifteen. In all these cases, I have closed the opening from the alveolus or the canine fossa after regulating the nasal respiration by more or less radical operations, and established an opening from the nose; and in by far the larger number of these cases I have succeeded in effecting a complete cure in the course of a few weeks or months, or at least in delivering the patient from the everlasting irrigations and the dependency upon the physician. It would be difficult to understand why many of these eminently chronic cases should be completely cured, unless, indeed, there had before been very considerable influences unfavorable to recovery in the shape of the presumably harmful factors above delineated, which are eliminated by the internal operation and replaced by favorable ones.

The further prospects for the internal treatment of the frontal sinus cannot, of course, be determined from the twelve cases<sup>3</sup> that

<sup>3</sup> In the meantime I have operated upon two more cases with greatest success.

have been operated upon so far, especially as I have employed this method only about six months. But all of these cases have remained free from any discomfort. In one instance, where considerable headache is yet in evidence, it is to be accounted for by a well-developed anemia and myalgia in the absence of any notable discharge from the frontal sinuses, which have both been opened. Most of the patients show a very moderate discharge, and in three cases the suppuration has stopped entirely. In all these twelve cases severe combined empyema had existed for many years.

Very interesting and to some extent convincing is the history of an especially bad case which I will take the liberty of relating briefly:

Patient R., 62 years, of Brandenburg, came under my care through the kind efforts of Dr. Dörfer on the 4th of February, 1906. In the course of eight years, he had been operated upon internally and externally, and suffered from empyema of all the accessory sinuses. Only the ears were sound. Above the right eye there was a cicatrix from the external operation upon the ethmoid cells. In the alveolus on both sides were rubber obturators of the size of the little finger, and after their removal a thick stream of creamy, very offensive pus flowed from the cavities. All the teeth of the upper jaw had been extracted. During the rhinoscopy a terrible fetor was conspicuous, which, as the attending physician affirmed, could not be obliterated by any deodorant. A great many polypi, enormous granulations, an abundance of fetid pus, all this, in connection with the man's far advanced decrepitude, at first made me think of a malignant tumor. The maxillary sinus could be fairly well surveyed from the alveolar opening. There were no marked changes in the mucous membranes. Pieces of the ethmoid cells which I extracted proved to be non-malignant. I now operated systematically: corrected the existing considerable deviation of the septum, curetted the ethmoid cells within reach, chiseled away the entire front wall of the sphenoid cavity, and opened the right upper maxillary sinus from the lower nasal meatus with the result that the discharge from the corresponding alveolar opening became at once extraordinarily small, which was especially interesting in comparison with the continuous plentiful suppuration on the left side. Thereupon I operated on this side and *with the same success!* Without touching the seemingly but slightly changed mucous membranes of the antrum, I allowed the alveolar opening to close, and lastly I operated upon

the frontal sinuses on both sides from the anterior, and was enabled to establish canals of such breadth that the patient can insert a canula of 5 mm. thickness without difficulty and thus treat himself.

The result is a relatively splendid success. To be sure, there is still a small amount of discharge from every ostium, but the fetid, excessive formation of pus has stopped entirely, and I see the patient, who enjoys the best of health, only about every four weeks, when, perhaps, I may have to remove an insignificant granulation. The patient, who for eight years had been in extraordinarily sad circumstances, is now, after the short interval of four months, though not entirely cured, yet without distress, able to work, and saved from the most serious mental depression.

This one history is representative of many others resembling it, though not always dealing with equally severe cases. Nothing more, however, could be proved if I were to relate them all in detail.

If we compare with this the success of external operations, we must admit that it is hardly more striking. I have seen numerous patients suffering from empyema that had been treated for years from the canine fossa with the broadest kind of opening, who absolutely could not be cured. I have seen external operations upon the frontal sinus and the ethmoid cells performed by the most skilled experts, cases that had been operated upon two, three, even four times, where a copious discharge remained that, in some instances, could be reduced or removed only by internal intervention after the closing up of the internal wound. These facts are easily understood if we consider the course of external operations, say, for example, upon the frontal sinus. Large and extensive openings may be made; the entire frontal sinus surveyed; diseased mucous membranes, septa, etc., removed; drainage through the nose established;—but then the operator is forced to close up the cavity again completely after two or three days, if only for cosmetic considerations. Whatever now happens inside the cavity, whether, perhaps, the contents of the orbits escape into the cavity, whether pus is secreted from new granulations or polypi that form in connection with unremoved fragments of mucous membrane, whether folds develop in which pus is deposited—all these possibilities are hidden from observation. Only from a broad nasal opening can the cure be influenced to any extent; and it is my belief that patients are much better off who have a broad nasal opening already established before so comprehensive

an intervention. If, on the other hand, the entire anterior wall is removed, and the cavity allowed to close by granulation, the consequences, especially in the case of large cavities, are severe cosmetic disturbances that cannot be sufficiently overcome even with paraffin injections.

To summarize briefly:

1. In every case of accessory sinus empyema, physiological breathing is first of all to be established.
2. In every case it should be attempted to bring about a cure by establishing a blood drainage opening into the nose.
3. In a large number of cases, perhaps in most cases, the frontal sinus also can be opened from within easily and without danger if the proposed method be followed.
4. The external operation is to be resorted to when the discharge is continuously profuse or of long duration; also when life is endangered. The after-treatment in such cases is to be conducted from within, unless the complete obliteration of the cavity by means of granulation is to be effected.

Wilhelmstr., 146.

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## PHARYNGO-MYCOSIS OR PHARYNGO-KERATOSIS.\*

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**HISTORY:** Although the symptoms of mycosis or keratosis of the pharynx are both prominent and characteristic, information concerning this affection constitutes a relatively recent addition to medical knowledge. The literature of the disease begins with Fraenkel, a Berlin laryngologist, who in 1873 published an article on an affection designated by him as *Mycosis tonsillaris benigna*.<sup>1</sup> Seven years later, a similar case coming under the author's observation, the condition received further study, and came to be attributed to the activity of a micro-organism, the *Leptothrix buccalis*. Meanwhile, the disease had been observed by Baginsky, in a case of ozæna of the trachea,<sup>2</sup> and by Klebs,<sup>3</sup> who ascribed it to the *Leptothrix buccalis*. These views were confirmed by the histological and bacteriological research work of Heryng.<sup>4</sup> This investigator was the first to specify *Mycosis benigna* as *Mycosis leptothricia*, for he attributed the disease to the growth of the *Leptothrix buccalis*, notwithstanding his negative experiments with the inoculation of the fungus upon the conjunctiva of rabbits.

Fraenkel's second case, presented before the Gesellschaft der Charité Aerzte in Berlin in 1880, was promptly followed by an observation of the French author, Bayer, who reported two cases in 1882.<sup>5</sup> Other early cases were reported by E. Fraenkel,<sup>6</sup> Stoerk<sup>7</sup> and J. Gumbinner<sup>8</sup> of Berlin.

France again contributed to the literature the findings of Guinier<sup>9</sup> and Ferre,<sup>10</sup> who accepted the leptothrix theory. About this time, Chiari ascribed the condition to an excessive proliferation of the leptothrix, a normal inhabitant of the buccal cavity.<sup>11</sup> Under the title, *Algois faucium*, a monograph dealing with the subject was published by Jacobson,<sup>12</sup> which is considered by Siebenmann as having supplied the reverse of elucidation of the pathological picture under consideration. The disease has been described under the name *Seborrhea tonsillaris* by Stoerk, 1895, and of *Angina leptothricia* by Schmidt, 1897. B. Fraenkel considers the best name for it to be indifferent *Mycosis benigna*.<sup>13</sup>

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While the stream of contributions to the subject kept constantly increasing after this date, for a number of years little or no doubt was expressed as to the correctness of the assumption of a parasitical etiology. In 1895, however, Siebenmann proposed the chemical theory, and suggested a change of the term *Mycosis leptothricia* to another more expressive of the actually existing conditions: "Hyperkeratosis lacunaris."<sup>14</sup> Although far from universally accepted at first, this theory, which relegates the leptothrix to the background, has been steadily gaining new adherents, until at the present time, the foundations of the parasitical theory appear to be giving way before the weight of new evidence. Richardson,<sup>15</sup> Lincoln,<sup>16</sup> Hemenway and Brown-Kelly were among the first to share the views of Siebenmann. Kyle differs from Siebenmann by the establishment of two distinct varieties of the affection, in one of which the leptothrix is entirely absent.<sup>17</sup> A process of keratosis instead of mycosis, was assumed to be the fundamental cause of the disease by Brown-Kelly, on the basis of ten personal observations.<sup>18</sup>

The parasitical origin of pharyngeal hyperkeratosis is not doubted by Andre Castex,<sup>19</sup> nor by Moure.<sup>20</sup> Sendziak, in his illustrated prize essay entitled, "The Etiology and Treatment of Mycosis Occurring in the Upper Respiratory Tract,"<sup>21</sup> expressed the opinion that the condition constitutes a typical mycosis, caused by the leptothrix buccalis.

On the other hand, Siebenmann's interpretation of the condition was accepted and endorsed by Onodi and Entz,<sup>22</sup> who merely suggest a slight modification of the term Hyperkeratosis pharyngea proposed by Siebenmann. They reserve this designation for those cases only in which actual horny spikes have developed, whereas the milder forms, in which the change consists of thickening of the epithelium, are simply labeled as pharyngeal keratosis.

In his recent contribution to the subject, entitled: "Pharyngeal Hyperkeratosis,"<sup>23</sup> Florea Simonescu renders the statement that hyperkeratosis is not a microbic parasitical disease, and that for the explanation of its pathogenesis, a new or clinical theory is required besides the parasitical anatomico-pathological theory. In addition to his personal observation of a case, he submits a collection of thirty-one cases from the literature, reaching the following conclusions. Pharyngeal hyperkeratosis is more frequent in women than in

men (25:7). Hyperkeratosis is not a parasitical disease, and the leptothrix found in this condition is only a secondary complication devoid of importance for the evolution of the disease. In virtue of its primary lesions as studied under the microscope, this form of hyperkeratosis belongs to the general class of the cutaneous hyperkeratoses.

ETIOLOGY.—It results from the literature that the *Leptothrix buccalis* is most commonly conceded to be the causative factor of the disease. The term really includes four chief constituents of the buccal flora, namely, the *Bacillus maximus buccalis*, *Spirillum sputigenum*, *Spirochaete dentium*, and the *Leptothrix inguinata*.<sup>21</sup> A run-down condition of the system has been supposed to predispose to an exaltation of the mycotic growth (Semon), and again, the sequelae of chronic inflammatory conditions have been regarded as an essential requirement. The affection has been observed to arise in connection with an exclusive milk diet, or with promiscuous handling and fondling of animals. Malaria has been assumed as the predisposing factor in benign pharyngo-mycosis, the pathogenic bacteria being supposed to resemble a fungoid growth of stagnating waters (Hem-enway).

A radically different etiology is propounded by Siebenmann, according to whom the pathological process is essentially a cornification of the lacunar epithelium. The evolution of the leptothrix fungus here is presumably referable to the altered nutritional conditions of the soil. A similar and even more practical importance is possessed by this keratosis of the lacunar epithelium as constituting an easy avenue of entrance for pathogenetic microorganisms, notably the tubercle bacillus and the pus cocci.

While admitting the parasitical character of the disease, a number of authors (Lober, Oltuszewsky, Vanderpool, Schiffers, Goris, Spaans, Putermann, Newcomb, Jurasz, Lennox-Brown) insist upon the simultaneous existence of other local or general conditions favorable to the growth of the fungus.

One of the most recent writers on the subject (Simonescu) says that, in a general way, all cutaneous or mucous keratoid productions owe their origin to an abnormal diathesis as well as to nutritional or vasomotor disturbances of the skin or mucous membranes. This predisposition to hyperkeratosis is not permanent. Originally produced by certain pathological conditions of the organism, it disappears with the re-establishment of the general health. During, or sometimes after, this disturbance, the mucosa of the throat furnishes only an insufficient quantity of a thickened secretion, whose chem-

ical composition has ceased to be normal. Circulation and innervation being interfered with, the deep epithelial layers, instead of being regularly renewed, tend to produce fine scales which are devoid of nuclei; analogous to the process of cutaneous hyperkeratosis. As a result of these nutritional changes, the modification of the lining epithelium of the throat (tonsils, pillars, pharynx, etc.) is followed by horny changes. As they increase in size, these productions finally pass beyond the orifice of the tonsillar crypts and of the follicles of the pharyngeal mucosa. This constitutes the evolution and establishment of hyperkeratosis. After it has once made its appearance externally, the leptothrix and the other microorganisms of the mouth are superadded.

The fungus is relegated to an entirely secondary position by Kraus,<sup>25</sup> who considers the disease as a hyperkeratosis pure and simple, grouping it together with Pachydermia laryngis, Leukoplakia and Nigrities of the tongue. Arnsperger<sup>26</sup> assumes an inflammatory basis for the disease, the fungus playing merely the part of a parasite. He divides the affection into two distinct pathological processes, namely, mycosis and hyperkeratosis. Simonescu believes that the most plausible explanation of pharyngeal hyperkeratosis rests upon a temporary lowering of the general health, either under the influence of neurasthenia and general weakness, or under that of dyspepsia or chlorosis and anaemia, especially in women (loc. cit.).

LOCALIZATION.—The upper respiratory tract is susceptible, and may be affected, in part or in its entirety, including the nasopharyngeal cavity, Luschka's tonsil, the pharyngeal orifice of the Eustachian tube, Rosenmüller's fossa, the laryngeal surface of the epiglottis, the ary-epiglottic ligament, the sinus pyriformis, the vocal chords and the larynx below these structures. More commonly than in any other region, the fungus flourishes in the faucial tonsil. Mycosis leptothricia here may be unilateral or bilateral, and frequently involves at the same time the lingual tonsil, which region is assumed as the most common location of the trouble by Fraenkel and Kraus.<sup>27</sup> The seat of the lesion was practically limited by Siebenman, and after him by Hemenway, to the faucial tonsils and their crypts.<sup>28</sup> These views are not supported by the recent writings of authorities, such as Sendziak and Simonescu. The last named observer states that the term Pharyngeal hyperkeratosis is more appropriate, because more accurate, than any other designation, including Siebenmann's Lacunar hyperkeratosis, and Brown-Kelly's

Pharyngeal keratosis. According to him, the minute whitish manifestations of the fungus growth may be distributed to all the various regions of the throat; and this disease claims a distinct and plainly outlined position in the pathology of the pharynx.

**PATHOLOGICAL ANATOMY.**—In the microscopical examination of affected tonsils, Siebenmann demonstrated the presence of structures which have been visible microscopically as projecting spikes. These he showed to consist of sacs of cysts, with relatively thick walls, and made up either of stratified layers of nonnucleated corneous epithelium, partly of a homogenous, horny substance, resembling that of a human hair. The central lumen of the spike was very fine and usually clogged with detritus, bacteria and mucus, although sometimes filled with adenoid tissue which evidently was connected with the remaining tonsillar substance by an orifice at the bottom of the cyst wall. Where the spikes projected beyond the crypts of the tonsils, they were locally studded with bundles of leptothrix fibres. All the signs of inflammation, such as hypertrophy of the connective tissue and marked roundcell infiltration, were conspicuously absent in the surroundings of the crypts. The process evidently constituted a remarkably intense cornification of the lacunar epithelium. Heryng stated in 1884 that the small projections were formed by an accumulation of cornified epithelial cells, surrounded by a finely granular yellow mass, strongly refractive under the microscope, with a surface covered by leptothrix filaments. Ferre<sup>20</sup> claimed that the whitish deposit of mycosis consisted in round cells, which had undergone more or less fatty degeneration, and in microorganisms appearing under various forms, all representing filaments of the *Leptothrix buccalis*. The character of the pathological concretion as always containing a nucleus composed of cornified epithelial cells, closely adherent to each other, with the leptothrix filaments simply arranged around the nucleus, was likewise recognized by Hemenway (loc. cit.), and by Knight.<sup>20</sup> These findings were corroborated by de Nabias and Sabrazes, who published the results of their investigations under the title, "*Corps Etrangers et Productions Cornées de l'Arrière Gorge dans la Pharyngo-Mycose.*"<sup>21</sup> The small projections were interpreted by Brown-Kelly, in 1896, on the basis of ten personal observations, as an accumulation of cornified epidermal lamellae; the condition accordingly constituting a true keratosis.

According to the definition of the disease given by Andre Castex (loc. cit.) pharyngomycosis is an affection characterized by para-

sitical products which stud the walls of the pharynx chiefly in the crypts of the palate and lingual tonsils. Imbedded in a crypt or a glandular cavity, the mycotic growth rests upon a base where the lymphoid or glandular tissue has become replaced by a sclerotic layer, the vessels of which are atrophied. An accumulation of horny epithelial cells projects above this sclerotic layer and is interspersed with the leptothrix spores and filaments. In the opinion of Garel, these histological features seem to point to the alteration of the crypts as the primary factor, with the mycosis as the sequel. According to the histological investigations of Onodi and Entz (loc. cit.) the character of the disease, at the base of the tongue as well as at the tonsils, constitutes a horny change of the epithelium, namely, a tissue metaplasia, accompanied by a moderate inflammation of connective tissue. The disease develops on a basis of chronic inflammation, as evidenced by the histological specimens. Several investigators mention the fact that the disease appeared in individuals who had repeatedly suffered from inflammatory conditions of the throat. In all probability, the weak but long continued irritation produced by the repeated inflammation is the cause of the rapid increase of the epithelial cells. The finding of leptothrix threads at and within the epithelial layers is purely accidental. The fungus stands in no sort of etiological connection with the disease.

BACTERIOLOGY.—The *Leptothrix buccalis*, claimed as the cause of the condition under consideration by a number of authorities, including Sendziak and Andre Castex, has never been obtained in pure culture. According to the former observer, it is claimed by Jacobson, that the culture was apparently obtained in 75 per cent of his cases, from the tufts within the tonsillar crypts.<sup>22</sup> The fungus is classified under the species of hypomycetia, and in the family of trichomycetia, by Petruschky.<sup>23</sup> The familiar microscopical picture of leptothrix, as represented by its most important variety, the *Bacillus maximus buccalis*, consists in bundles made up of a number of parallel threads, while another form, the *Iodicoccus vaginatus*, presents in shape of small cellular chains.

The leptothrix is supposed to encounter conditions peculiarly favorable to its existence and multiplication between the filaments of the pathological products, which explains its almost invariable presence, but to play a very secondary part in the actual production of the disease, by Garel, on a basis of twenty-nine personal observations. The organism has been demonstrated in several other conditions, including tonsillar concretions, tonsillar mycosis, and

also adenoid vegetations of the nasopharynx.<sup>28</sup> The effect of *Leptothrix* upon buccal fermentation, the production of acid saliva and dental caries, also of a tendency to gastric dyspepsia, may be said to constitute the first link in a vicious chain, all the above enumerated conditions predisposing to a lowering of the standard of general health, and with it to the settlement of this malevolent horde of parasitic invaders. Petruschky (loc. cit.) does not consider the fungus as pathogenetic in character. The seat of predilection of the parasite is on the palatine tonsils, also on the lingual and Luschka's tonsil. The growth was found by Castex on an arytenoid fold. Other parasites than the *leptothrix* found in these mycotic formations are the *Bacillus fasciculatus* (Shadebeck, 1882), the *Oidium albicans*, *Nigrities linguae*, *Mycosis sarcinae*, *Aspergillus fumigatus*, *Actinomyces*. Mycotic growths in general are favored by local pathological conditions of the larynx. An acid condition of the saliva is considered essential to the growth of *leptothrix* by Charles Robin, and corroborated by other observers.

**SYMPTOMS.**—The patient, in the majority of cases, a young or middle aged female, as a rule, makes the discovery of a whitish growth studding the throat by a mere accident, although these findings may be preceded by a sensation of roughness and scratching in the parts. On closer inspection, a number of whitish plugs, more or less solid, are seen projecting above the surface, usually affecting the Faucial tonsil and the base of the tongue, where the projections may attain the size and shape of long spikes or thorns. Inflammatory phenomena are usually absent. The act of swallowing becomes painful in the more severe forms of the affection only, which may likewise be accompanied by rise of temperature and swelling of the cervical lymph glands. The formations are characterized by their solid attachment as well as by their hard consistency, both properties serving to distinguish them from other tonsillar concretions (Siebenmann). Whereas measures designed for their removal are usually inefficient, these formations have a marked tendency to subside spontaneously within a few weeks or months. The condition may be associated with, or give rise to, certain nervous hypochondriac states, referable to the morbid fears of the patient. The most prominent among these nervous complications in paraesthesia pharyngis. The affection as a rule pursues an insidious course, extending over a variable period, from a few weeks to several years. The growth may present a sudden ex-

uberance, or on the other hand the proliferations may subside spontaneously. The character of the condition is distinctly obstinate, not to say rebellious to all forms of treatment. In contradistinction to the unanimous view of writers on the subject, Simonescu says that the nature of the disease is not chronic, but that it is characterized by a temporary progression.

DIAGNOSIS.—Opinions are divided as to the simplicity of the diagnosis without the assistance of the microscope. The experience of the examiner probably plays a more important part in this connection than the distinctness of the traces left by the fungus in the throat of the patient. Cheesy tufts, such as those appearing in caseous tonsillitis, while presenting a somewhat similar appearance, may be differentiated by their ready surgical detachment no less than by the strict limitation to the crypts of the tonsils. Mycosis leptothricia is not limited to any one portion of the upper air passages; the only part in which it has not been observed being the nasal cavities. Sendziak believes that a certain number of cases of caseous tonsillitis, if examined minutely under the microscope, will turn out to be real cases of Mycosis leptothricia. (Etiology and treatment of mycosis, loc. cit.) The local manifestations of Angina tonsillaris follicularis, although usually accompanied by a high fever and swollen lymphatic glands, may present a close resemblance to Mycosis leptothricia. Neither does Diphtheria invariably bear the hallmark of the diphtheritic membrane, and the presence of this disease instead of that of the more harmless disorder can sometimes be determined only by means of the microscope. In lacunary tonsillitis, the tonsils are swollen and painful, and the yellow points do not project like the mycotic plugs. Calcareous concretions of the tonsil are not numerous and may be readily removed. Thrush is differentiated by its occurrence in infants, at the margins and rim of the tongue, under conditions of general cachexia. Herpetic angina is generally situated at the velum of the palate, and associated with vesicles having a characteristic red areolar zone. In miliary tuberculosis, the lesion is not in the tonsils, and the general condition of the patient is suggestive of the pathologic deposit.

While the prognosis of any given attack of Pharyngomycosis or Pharyngokeratosis is not unfavorable, recovery having been observed to take place in the absence of any remedial measures whatsoever, the patient remains susceptible to this and kindred pathological processes not only, but there is a marked tendency to recurrence.

**TREATMENT.**—In those cases where the discovery of the condition is the result of an accident, all treatment is considered as superfluous by Onodi and Entz (*loc. cit.*). In the presence of disturbing symptoms, however, local treatment is positively indicated. Rinsing or painting with bactericidal solutions is entirely unnecessary in *their* opinion, the character of the disease consisting in the cornification of the lacunar epithelium rather than in the proliferation of the fungus. Treatment may consist in the mechanical removal of the plugs, namely, excochleation with a sharp curette, extirpation with sharp forceps, or in the ablation of large portions of the tonsils by means of the tonsillotome, with the knife of the galvano-caustic loop. This radical interference is followed either by cauterization with trichloracetic acid, or with the galvano-cautery to prevent reaction. The total removal of the spikes and plugs not only contributes to the peace of mind of the patient, but it usually does away entirely with a repetition of the trouble.<sup>33</sup>

Castex recommends spraying with menthol or carbolic acid, both morning and evening. The tonsils may be touched with a solution of zinc chloride or iron perchloride. The procedure of election consists in the extirpation of the mycotic plugs with fine tweezers; to be followed by galvano-cauterization of the evacuated crypts. Should the affection prove rebellious, it is advisable to remove all parts of the tonsillar mass. Although convinced of the parasitical origin of the trouble, Castex insists on the necessity of attention to the general health, notably, the management of an existing dyspepsia, or other disturbing conditions. The same importance was attached to the correction of gastrointestinal irregularities by Richardson.<sup>34</sup> This author does not consider local treatment as required in cases without subjective symptoms, in which opinion he does not stand alone.<sup>35</sup> Radical local treatment is, however, advocated by the majority of observers, in order to counteract the marked tendency to recurrence. The galvano-cautery has its adherents, Castex, Root, Sendziak, as well as its opponents, Semon, Otuszewsky, Spicer. Jacobson does not consider the galvano-cautery or the performance of tonsillotomy as indicated, and he prefers the mechanical removal of the plugs, to be followed by rinsing with mercuric bichloride (1:2,000.). Scraping of the tufts with a sharp spoon curette, puncturing of the crypts with a sharp cautery, all have their advocates, Sendziak, Heryng, Hemenway (*loc. cit.*), Cheatham,<sup>36</sup> Thomas.<sup>37</sup> Sheck advocates mechanical measures, such as excochleation, tonsillotomy, and the use of the

galvano-cautery; whereas, Stoerk obtained the most satisfactory results from the local application of a 2 per cent solution of creosote.

A considerable number of remedies has been employed more or less successfully, such as bichloride gargles of variable dilution (1:1,000 up to 2 per cent), zinc chloride, silver nitrate, salicylic acid, absolute alcohol, pyoktanine, formalin, tincture of iodine, chromic acid, trichloroacetic acid, etc. Nicotine was administered by Jurasz in a proportion of 2:100.<sup>41</sup> The alkaloid proved useful in a case of Sendziak's, as did also tobacco smoking, and observation confirmed by Donellon,<sup>42</sup> and Heryng (loc. cit.). Tobacco is mentioned as a remedy of possible value in this connection by Castex (loc. cit.). He and Sendziak are agreed upon the desirability of removing hypertrophic tonsils, when the structures are markedly enlarged and the disease proves rebellious to treatment. The galvano-cautery snare is especially recommended for the purpose in order to prevent the occurrence of secondary hemorrhage, which view is not sustained by the writer.

A case of hyperkeratosis of the pharynx, in which the leptothrix buccalis was not demonstrated microscopically, in a young girl 15½ years of age, was successfully treated in the following manner by Simonescu: After the buccal cavity had been rendered antiseptic by gargling with a solution of salicylic acid (2 per cent), the pathological products were ablated in two sessions, with an interval of ten days, by means of a small, sharp curette. Each spot from which a tuft had been removed was touched with a solution of chloride of zinc (1/50). That many of the remedies proposed are worse than the disease itself, is conceded by certain observers, such as Schmidt, Rosenberg, Fraenkel, and Chiari, who prefer tobacco smoke, or the local application of trichloroacetic acid, absolute alcohol, and chromic acid, respectively.

In conclusion it may be stated that a comparative review of the publications on the subject of this peculiar affection shows a pretty general tendency on the part of writers to accept the leptothrix theory. No *particular importance* is by them attached to the fact that this mycotic growth is normally present in the mucous lining of the tongue and on the surface of the teeth.<sup>43</sup> It is likewise disregarded by some writers that an ulcerated condition of the buccal mucosa, with lowered cellular vitality or local death of tissue, assists these parasitic proliferations. Notwithstanding its nonpathogenic character, the parasite has claimed a considerable degree of

attention on the part of investigators, ever since it was first described by Robin in 1853.

On the basis of recent research work, the view is gaining ground that the settlement of the fungus at the diseased epithelial lining constitutes a secondary, rather than primary process. According to Onodi and Entz, the changes of the epithelium have, so to speak, prepared the soil for the microorganism, without standing with it in any kind of etiological connection. Richardson, while recommending the radical destruction of the matrix with the submucosa, in order to eradicate the trouble in rebellious cases, regards the leptothrix as a secondary intruder, not as the cause of the disease. Reasoning on a basis of analogy with parasitic stomatitis, it would seem as if the mycotic growth under present consideration were indirectly dependent upon an altered chemical reaction (hyperacidity?) of the secretions of the mouth, due in its turn to a local nutritional disturbance, perhaps ischaemia and defective innervation. A certain degree of inanition on the part of the individual appears to have been present in every reported case; and suboxidation, local or general, constitutes in all probability a *sine qua non* of the affection.

The true explanation for the process of pharyngomycosis, or hyperkeratosis, if this should prove to be the essential factor of the disease, is one of the contributions to medical knowledge we are perhaps justified in expecting from a not too distant future.

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## VOCAL NODULES.

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In THE LARYNGOSCOPE of November last appeared an article by Dr. Frank E. Miller, of New York (The Cause of Vocal Nodules), in which I have been misquoted as to the method advanced by me for the cure of singer's nodules. As my method has been in use for some fifteen years and has been accepted by the greatest singers of today as the most efficient means of relieving the condition known as singer's nodules, a condition so frequently encountered in operatic coloratura artists, it seems but just that I should be rightly quoted.

Alluding to the investigations made by Prof. Oertel, verified by Koschlakoff, Simanowski and myself, in regard to the manner of vibration of the vocal cords,<sup>1</sup> Dr. Miller, on page 850, makes use of this most remarkable and complex sentence: "Of course, we will have our own opinions, and, having made some investigation, we think that this is not proven beyond a doubt; and we do not believe that it can be so, for the one grand reason that it is impossible to make proper observation with an instrument which employs a human subject whose cords are to be seen, again the eye and hand of the operator, and still further an instrument whose revolutions are too rapid for the human eye to make correct observation; and then again in all of these observations we can see only the one side of the cord, that being the upper side."

It is clear to my mind that Dr. Miller has never seen a laryngoscope, and has never studied the principle of the siren; for only by means of this instrument can the cords be studied in vibration. This is accomplished by making the pitch of the siren the same as the note sung. The instrument is illustrated and fully explained in my book entitled "Voice Building." No argument, consequently, is possible on this subject. Again, on page 860, Dr. Miller says, in referring to the treatment of nodules: "Dr. H. Holbrook Curtis's demonstration consists in depressing the chin on the sternum, using supra-costal respiration, at the same time singing the syllable 'Maw' at middle 'C' falsetto, while plucking the lips with the finger and focusing the tone 'Dans le Masque.'"

<sup>1</sup> *Arch. f. Laryngol.*, 1895 and "Voice Building and Tone Placing," D. Appleton & Co., N. Y., 1896.

"Dr. Curtis's idea might be explained on the ground that by singing falsetto the position of the arytenoids are so changed in their action on their cricoid facets that the edges of the vocal bands have a different alignment, hence vibration under such conditions might benefit and reduce the nodular condition of the cord, as it would no longer be irritated by the opposing cord. But the voice specialist should not use vocal exercises for inflammatory conditions nor allow singing at all for at least ten or fourteen days, dependent, of course, upon circumstances."

It seems to me that Dr. Miller is taking a very narrow view of the causation of singers' nodules, if he narrows it down to the presence of cheesy deposits in the tonsils, and he has wasted much valuable time in experimenting with his goats and dogs. Ingrowing nails may be quite as prolific a cause of nodules, or any other bodily ailment as well, provided it give sufficient discomfort to disturb the vocal poise.

I have seen a pair of well-developed nodules result from singing an opera after news of the death of a child was received immediately before a performance, and I have seen many nodules appear on the cords of the great artists, who have scarcely a vestige of tonsillar tissue between the pillars of the fauces.

Dr. Miller leads one to infer that my exercises are to be sung in the falsetto register. I have shown frequently with my own voice in the falsetto register how a soprano should do these exercises, but my specific rules are as follows:<sup>2</sup> "If a soprano, take middle C, or a note thereabouts, for example,

"1. Hum a tone with the mouth closed, preceded by a slight puff of air through the nose, as one would imitate the hum of a bee.

"2. After making this tone as pure and musical as possible (by musical is meant resonant or full of overtones), fix the mind upon the word *Maw* and mentally bring forward the tone, almost saying it, until we fell conscious of the vibration upon the lips; at the same time the position of the initial tone should not be changed. To ascertain if the mouth focus is correct, simply pluck the lower lip with the finger as you would pluck the string of a musical instrument, and if the mouth tone is sufficiently far forward an explosive sound like *Maw* will answer. If this tone is not of almost equal purity to the head tone, which all the time must be sounding, the equilibrium of tone, i. e., the division into

<sup>2</sup> "Voice Building and Tone Placing," p. 154.

the mouth and facial, is not satisfied, and we must experiment until we get the mouth tone as pure as the facial.

"3. Having gotten the purest tone possible, let us now direct the pupil to drop the lower jaw and open the mouth by simply allowing the weight of the jaw to accomplish this without the slightest muscular effort. Our mental *Maæ* now breaks on the lips into tone, and we have the pure vowel with its prefixed consonant without being aware of the effort that has produced it—it comes so spontaneously and beautifully, and seems to originate on the lips. The mouth is now closed, and if we have not interfered with our focus of attack, we hear the initial *Hum* still vibrating pure and beautiful in the facial resonators.

"4. After this exercise with the correct focus of tone has become thoroughly familiar, the next step is to take a phrase and sing the notes with *Maæ* or *Ma* instead of the words of the song, always commencing in that portion of the scale which will allow of the easiest initial tone for the focus.

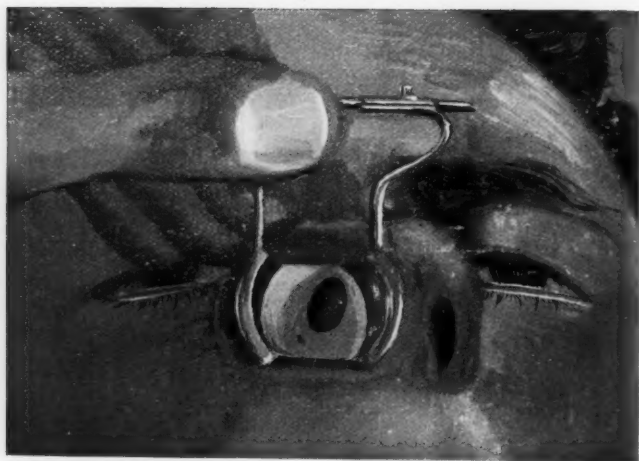
"These are the exercises so much appreciated by singers that we employ for the reduction of nodules of attrition on the cords, which exercises, strange to say, have been the object of ridicule by certain laryngologists who have undoubtedly not given the subject of physics a proper amount of consideration. We are indebted to the stroboscope for the scientific vindication of our theory and treatment of singers' nodules. The word *Maæ* should be sung in this manner for several minutes at a time and every hour in the day. It makes no difference on what note it is sung, provided the resonators add new overtones to the voice and thus produce a rearrangement of the vocal cords in their manner of vibration. These exercises must be accompanied by the high-chest method of breathing, as described in the chapter on respiration. As we have so often stated, an additional resonance and consequent augmentation of overtones is derived from this source, and constructively assists in the rearrangement of the manner of vibration of the cords, at the same time increasing their tension. After all, the correct focus of attack or the proper placing of tone is the most important thing to be studied in singing. Without it our voices do not possess charm and the vitality is jeopardized. By the steady employment of them for an hour the above exercises have pulled many a weary voice together, and enabled many a distracted artist to go with confidence upon the stage or platform. Their daily use gives new overtones to the voice, prevents

attritus and allied affections of the cords, and enables the singer to use his voice through many a cold with comparative immunity. In the treatment of relaxed cords and of congested cords, a good piece of advice to give a pupil is this: Until you can do a pure *Hum* with the mouth closed and without effort, do not attempt to talk, simply whisper and make the attack upon the lips even while doing this. By observing this rule many a prolonged hoarseness may be prevented. In either of the above conditions the *Maw* exercises may be commenced with benefit to the cords as soon as the head *Hum* is easily produced."

Dr. Miller sees fit to state that the vocal exercises advocated by me for a correct voice placement, and for the cure of singers' nodules, are "not a useful procedure" and are "apt to upset a voice mechanism acquired after years of study." He goes on to say: "By a remarkable combination of circumstances it has been my privilege to have under my professional care all four of the leading solo soprano voices of old Trinity, St. George's church, Heavenly Rest, and St. Thomas's." The doctor names them and goes on to state that the nodules found in their throats were all of tonsillar origin. That I do not gainsay, but, while I admit that nodules may be due to cheesy deposits, they are due also to many other causes. And while no such "remarkable combination of circumstances" may have occurred to me, I have made a most serious study of nodules and the theory of voice placement, and the system of cure I advocate has been endorsed by such singers as Jean de Reszky, Melba, Sembrich, Patti, Ternina, Caruso, Scotti, Fremstad, Plancon, Galski and many others who have assisted me in the study of fundamental tone placing.

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FIBROUS ATRESIA OF NARES.

## A CASE OF FIBROUS ATRESIA OF NARES.\*

BY JOSEPH H. ABRAHAM, M.D., NEW YORK.

G. H., aged 15; admitted to Professor Delavan's clinic October 23, 1906.

*History.* Two years ago, while playing baseball, a bat slipped from the hands of a fellow-player and struck him on the right side of his face and nose. His nose bled profusely, and the little patient was carried to a hospital. After remaining one week he returned to his home and since then gave little thought to his nose, excepting his inability to breathe through the right nasal cavity.

*Examination.* Externally, there is a perceptible deflection of the nose to the left; also a slight depression on the right side of the nose at the junction of the lower border of the right nasal bone with the soft parts of the nose. Intranasal examination reveals a most peculiar pathologic condition on the right side, situated at the junction of the muco-cutaneous surface of the vestibule in its entire circumference. A fibrous circular web can be detected with an oval shaped opening in its centre 8 m. by 5m. in diameter. Through this narrow opening the patient attempts to breathe, but finds it impossible, as you can see when I place my finger in front of his left nostril.

On October 30th, I injected a  $\frac{1}{2}\%$  solution of cocain with 1-5000 solution of adrenalin chloride into the web and removed it by a careful dissection. The free surface of the web was very thin. The attached surface varied in thickness from 2 to 5 m.m. A packing of iodoform gauze 5% covered with soft rubber tissue with numerous perforations for free drainage was inserted. Three days later I removed the packing and on October the 9th, discharged the patient cured without a sign of contraction and with normal breathing.

616 Madison Ave.

\* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, October 24, 1906.

## ON THE COMPLETE REMOVAL OF DISEASED TONSILS.

BY E. MORAWECK, M. D., AND G. C. HALL, M. D., LOUISVILLE, KY.

At a meeting of the New York Academy of Medicine, Section on Laryngology and Rhinology, May 23d, 1906, Dr. J. H. Abraham makes this statement as reported in *THE LARYNGOSCOPE*: "This was the first instance in which he had completely removed the tonsil." This statement provoked no discussion and went unchallenged so the society impliedly at least acquiesced in the belief that as a rule it is not necessary to remove the whole growth, or that it is not wise to do so or is inexpedient.

This statement is closely allied to the belief that if the tonsil is clipped or partially removed the rest of the organ will atrophy. Numbers of cases that we have seen of partial removal of the tonsils also strengthens us in the belief that quite a large percentage of men must follow this practice and we regard it as wholly erroneous and bad; for it subjects the patient to an operation without the certainty of relief and thus brings both operation and operator into disrepute, for a very little more care and time would result in the satisfactory removal of the whole gland. No surgeon would consider the partial removal of the appendix, the partial removal of any tumor if it is possible to remove it all or the partial removal of gall stones; therefore, why should this method be in vogue in the case of the tonsils? Some cases of this partial removal of which we speak are due to careless and incompetent operating but not all.

We do not know who is responsible for this theory but do know that it is not borne out in actual life. In the first place, tissues that show a tendency to hyperplasia show it in all parts, so that the stump of a tonsil that is partially removed hypertrophies instead of atrophies. Another thing, tonsils are very often submerged and more of the gland lies behind the pillars than projects from it; if therefore the gland is clipped even with the pillars you still have about two-thirds of your trouble remaining. You still have the crypts filled with infective material, catching pieces of food, still the chance of infection of the tonsil itself or the peritonsillar tissues. That the operation is inadequate and unsatisfactory can best be proved by the numbers of cases that come for secondary operation, for if once the gland were wholly removed it is inconceivable that it should grow again.

As instruments designed to thoroughly remove the tonsil, the various tonsillotomes on the market are wretchedly inefficient. The prongs of the instrument cannot be elevated high enough to raise the tonsil from its bed, so alone you can not hope to cut out more than half of the organ, and in case you use a separate forceps to pull out the gland, the prongs are simply in the way. The cutting edge, too, is very keen and thus predisposes to hemorrhage. Our preference is for the cold wire snare and the best is Kratzmueller's modification of Peter's snare.

The operation which we believe best fulfills the requirements in this condition is performed as follows: In the case of young children, we prefer a general anæsthetic, especially if, as is usually the case, there are adenoids to be removed also. The nose and throat are first cleansed and adrenalin is applied to both, as it materially assists the breathing which is always bad in these cases. Under full surgical anæsthesia, the tonsils are first separated from the pillars by blunt tonsil knives. With the forceps pulling the tonsil out from its bed it is then freed above and below with scissors curved on the flat. This is very important, as the junction of the pillars above is chiefly where a little portion of the glands remains after the operation. After this is done and the tonsils lie loosely in their beds attached only at the base, the forceps are inserted through the wire loop of the snare, made to grasp the tonsil in a firm bite including the extreme upper and lower portions; the wire loop is pressed firmly against the pillars and tightened while firm traction is made with the forceps; the whole gland is thus removed, which can be shown by the fact that the cut part of the tonsil is through fibrous and not lymphoid tissue.

As a rule there is very little bleeding following, which, however, is not the case where only a portion of the gland is removed. We have never yet had to deal with secondary hemorrhage when we removed all of the gland. After the slight bleeding from the first is controlled usually by persulphate of iron, the other one is similarly treated. The adenoids are removed last, care being taken to press the curette well up and back to get the upper part of the growth and to go over the sides, thoroughly cleaning out all the lymphoid tissues around the fossæ of Rosenmueller.

In older children that we can bring under control and in adults, we prefer cocaine as an anæsthetic. This we apply first to the tonsil and pillars in 12 per cent. solution on swabs and after about ten minutes inject ten to fifteen minims of a weak cocaine and supra-

renalin solution deep into the substance of the gland through the anterior pillars. We find that superficial injection is usually inefficient because the solution escapes through the crypts as fast as it is injected. In three to five minutes after this injection the patients usually complain of a slight oppression of respiration and experience rapidity of the heart's action which we believe due to the supra-renalin. Then is the time to operate, for if due to the anæsthetic the operation is the best antidote we possess.

As described above, the tonsil is quickly freed from the pillars, dissected out above and below pulled well out by the forceps while the wire loop of the snare is pressed firmly against the pillars. With one firm snap of the instrument the tonsil is completely removed.

A gargle of cold permanganate solution and applications of persulphate of iron stops all bleeding. Patients who are not readily accessible or who, living in the country, contemplate leaving for home the same day, are always given a hypodermatic injection of Ergot before leaving the office. We keep the patient quiet for twenty-four hours, give ten grain aspirin powders every three hours for any pain, which is usually referred to the ear, and allow a week to elapse before removing the other gland, though at times we have removed both at the same sitting.

The feature of the operation is the total removal of all diseased tissue—a true tonsillectomy. The points to be considered are: the thorough anæsthetization by local application and injection, which keeps your patient quiet and enables you to do the work thoroughly; the wide dissection of the tonsil as preliminary to the snare not only freeing it from the pillars but dissecting it free both above and below; a wide grasp with the forceps from above downward with firm traction, enabling the snare wire, with pressure against the pillars, to cut off the gland at the very base.

The operation as described is entirely satisfactory and we have not had a single bad result. All are relieved of their trouble and no secondary operations are necessary. We have never seen a case of severe hemorrhage following the operation. The method is similar to that of Pynchon's cautery dissection, but we prefer our instruments to the cautery as we believe we can keep them better under control.

We have not discussed the indications for the removal of the tonsils, as except in acute inflammatory conditions, we believe that the presence of a hypertrophied tonsil is sufficient indication for its removal.

Gaulbert Bldg.

## THE REVERSE ANTRUM BONE FORCEPS IN ANTRUM SURGERY.

BY LOUIS OSTROM, M. D., ROCK ISLAND, ILL.

Surgery of the Antrum of Highmore can be divided into two classes, radical and conservative. Of radical operations, we have a range of choice from the most radical of all, Denker's, to others

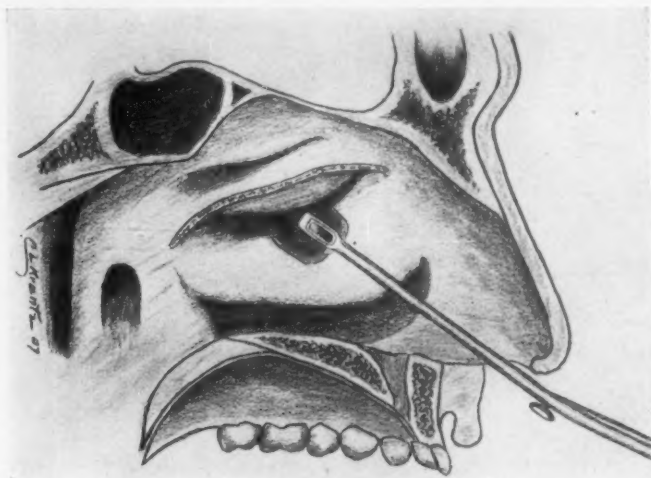


Fig. 1. Method showing the Enlarging of the Ostium Maxillare.

more or less complicated, which should be reserved for the desperate cases, where the disease has caused extensive necrosis or other tissue destruction. It must be said that many radical operations are performed where much simpler methods would be by far more preferable for the patient, with just as good results and far less suffering, provided the operation is carefully made.

Conservative surgery is only a relative term, but ordinarily means simple drainage through the alveolus, canine fossa, middle or inferior meatus, with slight modifications. Midway between

these extremes lies a wide medium, which varies almost from radical to conservative. If the operation can be performed under local anesthesia, with no pain, and little or no delay or detention from ordinary business, the operation may be radical to the surgeon, but easy or conservative to the patient, and conversely, if the patient is subjected to inefficient local or general anesthesia, he certainly will consider the most conservative operation quite radical.

I have performed every known Antrum operation, and in selected cases the results have been perfect. The more I do of

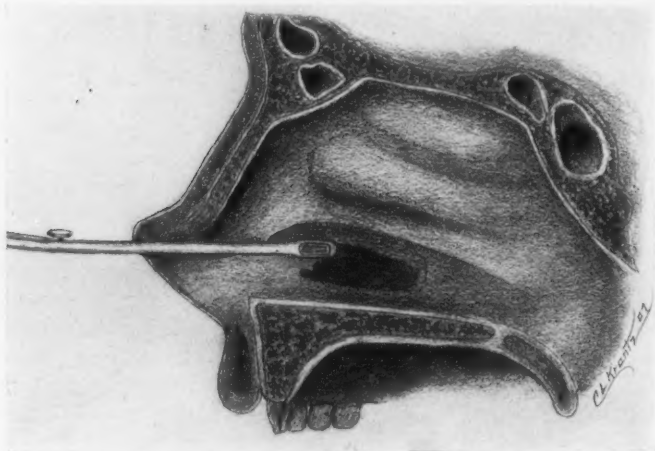
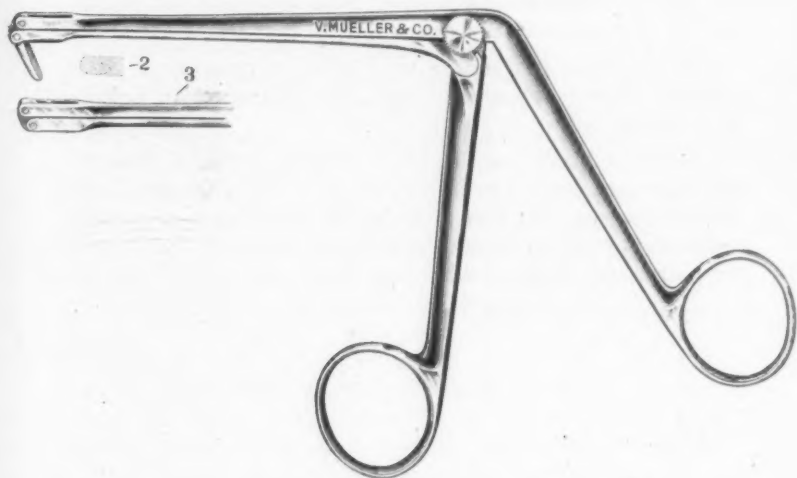


Fig. 2. Showing Method of Removing Inferior Meatal Wall.

this work, however, the more I favor medium surgery, that is, operations that take little of my patient's time, and cause him the least suffering, and are made rapidly and give good results.

By the use of my Reverse Antrum Bone Forceps, the technique has been very much simplified, and the operation only takes a short time, with no suffering for the patient. In all cases of Antritis, I nearly always remove the anterior end of the middle turbinate (of course, I exclude in this paper all cases that originate from the teeth), because I have never seen a case of Antritis

that needed surgical interference in which the anterior end of the middle turbinate was not enlarged, and by pressure obstructed the ostium maxillare. When the middle turbinate has been removed, the ostium is carefully examined with a probe in regard to size, etc. If the ostium is thought to be too small to allow sufficient drainage, either because of swelling of the mucous membrane at the edges of the Hiatus semilunaris, or by reason of the anatomical construction of the individual case, the infundibular groove is enlarged as formerly described by others, with Myle's exploring trocar or a strong probe-pointed knife, bent at right angles, which



is thrust into the ostium, and which ordinarily cuts the groove quite easy. However, if only this is done, the slit quickly heals, and the condition remains as before. At this stage, I insert the movable blade of my forceps into the Ostium, and, by cutting downwards and forwards, an opening can be made large or small by cutting away the Uncinate process, and in a very short time. If there should be any objection to removing any portion of the middle turbinate, the Ostium can anyhow often be enlarged as above described in selected cases, making this a most conservative operation.

In a great majority of antrum cases, however, it is best to operate through the inferior meatus. In this case, more or less of the anterior portion of the inferior turbinate is removed, and the antrum wall perforated with trocar, chisel, or trephine. The opening is very easily enlarged backwards and upwards, by using almost any nasal bone forceps, or more easily with the curette. If, however, it is not desirable to enlarge the opening backwards, or if it has been enlarged enough, then I use my Reverse Antrum Bone Forceps, and cut away quickly and easily the anterior portion of the antrum wall of the meatus, as far forward as desired, with no danger to the outer antrum wall, as there is with burrs or raspatories, and no pain or shaking of the patient. Through this opening direct treatment can be carried on to the antrum, as indicated.

The instrument is otherwise very handy in almost any nasal operation, such as the anterior ethmoidal cells, synechias, turbinal hypertrophies, etc.

My sincere thanks are due to V. Mueller & Co., of Chicago, who have experimented on the forceps since May, 1906, and finally brought it to its present state of perfection, combining great strength within small space. A more complete description of my method and the instrument will be published in a later paper.

People's National Bank.

**SOCIETY PROCEEDINGS.**  
**NEW YORK ACADEMY OF MEDICINE.**

SECTION ON LARYNGOLOGY AND RHINOLOGY.

*Regular Meeting, December 26, 1906.*

T. PASSMORE BERENS, M.D., CHAIRMAN.

PRESENTATION OF PATIENTS.

**Pedunculated Mucous Polyp Attached to Vocal Cord.** By JOHN LESHURE, M.D.

The patient was a man 40 years of age, a native of Germany. His mother died of some affection of the stomach, probably cancer, at the age of 35. His father died of old age at 90. Five brothers living, all healthy. For several years, the patient has been subject to attacks of hoarseness, and for the past nine months has been constantly hoarse. He has had no cough, expectoration, or marked degree of laryngeal irritation. About three months ago he consulted a physician, who said he had a cyst of the vocal cords. Examination shows the mucous membrane covering the vocal cords to be deeply congested and somewhat thickened; and attached to the anterior portion of the right vocal cord is a narrow band of fibrous tissue terminating in a tumor, the size of a small pea. When attempts at phonation are made this is shot up between the cords, resting upon them, falling back below the level of the cords when the latter are separated. One physician told the patient that the growth was a papilloma and that if removed it would be followed by a cancer. Dr. Leshure advised removal, however. The fact of the tumor being pedunculated narrows the histological diagnosis down to myxoma or fibroma, and its soft character suggests the former.

DISCUSSION.

DR. QUINLAN said that the growth looked like a myxoma and he thought it should certainly be removed. All of these growths do harm from the irritation they cause to the surrounding tissue, which naturally becomes hypertrophic as a sequence of compensation.

DR. HURD advised the immediate removal of the growth (or the man would cough it up some day).

DR. HARRIS said that he had never seen a laryngeal growth that had so many marks of myxoma. He certainly would not call it a papilloma; it does not show any of the characteristics of papilloma.

DR. BERENS agreed that it was probably a myxoma and that it should be removed. He thought that the Section should be grateful to Dr. Leshure for forbearing to remove it and presenting the case before them for inspection.

**Syphilis of the Larynx.** By JOHN LESHURE, M.D.

Male, aged 30. Occupation, machinist. Father and mother both living and well. A sister died at the age of 31 years, of heart disease, and a brother died at 28 with what was called "throat consumption." Previous history of patient reveals rather marked addiction to alcohol and tobacco. Denies syphilis. For the past four years he has been subject to colds, accompanied by attacks of hoarseness, and for the past nine months has been constantly hoarse. There is some cough and expectoration, but a physical examination of the chest and microscopic examination of the sputum have proved negative as to tuberculosis. No rise of temperature nor loss of flesh and strength. Examination of the larynx shows infiltration of the tissues covering the left arytenoid, a proliferation of granulation tissue in the region of the left false cord, and some inflammatory œdema extending upward toward the epiglottis. Patient was given large doses of potassium iodide for over two months and mixed treatment for several weeks without influencing the condition. Suspecting possible malignancy, some of the tissue in the region of the false cord was removed, and proven by the microscope to be simple granulation tissue, no tubercle bacilli or giant cells being found. The laryngeal picture resembles tuberculosis more than syphilis, but the absence of pulmonary involvement and negative sputa make the latter diagnosis more probable.

DISCUSSION.

DR. THURBER said he had seen the patient when he first came to the Vanderbilt clinic. The lesion then looked more tubercular than it does now. There was the pale infiltration of the arytenoids and hypertrophy of the tissue in the posterior commissure and along the internal face of the left arytenoid body, which is no longer present. The man was put upon iodides, but the service changed, and he had not been able to follow up the case.

DR. LESHURE replied that the man was getting 36 grains of iodide of potassium three times a day, and there were no bacilli found in the specimen examined.

DR. HARRIS said that the case undoubtedly fell into the class of doubtful cases which were discussed a month ago—without clear tubercular or syphilitic evidence. He understood Dr. Leshure to say that no history of lues had been elicited, and that there were no signs of general tuberculosis in the patient. The lesion in the larynx does not appear to be a clear syphilitic lesion. It was difficult to account for the amount of infiltration, the bulging of the false cord, and the character of the ulcer. Dr. Leshure said that the man had a little pain recently. Emphasis has been laid on the absence of pain in syphilitic lesions. He did not think that the inference that it was syphilis could be drawn until the man had been subjected to large doses of potassium iodide, much larger than he is now taking. He would be inclined to administer hypodermic injections of salicylate of mercury and large doses of potash for two weeks, and we could then judge of the effect of the antisymphilitic treatment.

DR. MAYER suggested that nothing had been said about the possibility of malignancy. From the examination alone he would suspect malignancy. Time and again attention has been called to the fact that the first examination of specimens removed might not show malignancy, while a second examination of the growth would reveal this condition. From the general appearance, the case suggested to him malignancy rather than anything else. Of course, the man's age would make it an operable case, and it was important to establish a diagnosis as soon as possible. The patient has been thoroughly saturated with iodide of potassium, but the growth has evidently not been affected by a dosage of over a hundred grains daily.

DR. HURD said that it was important that a large piece of the growth should be removed and examined. He did not think that Dr. Leshure had taken a deep enough section.

DR. BERENS said that the growth appeared to him to be syphilitic. The fact of his having this infiltration with little or no pain, without glandular involvement, which might or might not show malignancy, together with his appearance, suggested syphilis. The man's apparent iodism was due to faulty diet and faulty administration of the iodide rather than to a real iodism. His stomach seemed to have been upset. A wineglass may mean almost any-

thing from a liqueur glass to a champagne glass. He would advise putting the man on rapidly ascending doses of iodide up to 160, 170 or 180 drops, three times a day, and administer it an hour before meals in peptonized milk, and keep him on any form of mercury, and keep his skin and secretions active. He thought that if under this treatment the man at the end of six weeks did not show a marked improvement, it would then be plenty of time to remove a large specimen of the growth for examination. There was no immediate need for haste, and if the growth was really syphilitic the more tissue that could be preserved the better. If it is nonspecific, it is probably malignant.

DR. QUINLAN inquired if any record had been kept of the man's temperature, etc.

DR. LESHURE replied that it was a dispensary case and it had been impossible to keep the patient under observation. As far as they had been able to tell, his pulse and temperature were normal.

DR. HARRIS said that he hoped Dr. Leshure would present the patient again at a subsequent meeting of the Section, as the following up of such cases was of great value to the Section.

DR. LESHURE said that he would like to say a few words in regard to a case which he had shown before the Section in March, a case of tuberculosis of the angle of the mouth and of the tongue. Some of the members questioned the diagnosis then, saying that it seemed to be syphilitic. The disease progressed and the man had another tubercular ulceration further back, on the dorsum of the tongue, and ulceration of both tonsillar pillars, and finally died of pulmonary tuberculosis—one of the most extensive cases of tuberculosis of the upper air passages that Dr. Leshure had ever seen.

**Leukoplakia Buccalis, illustrated.** By D. H. ABRAHAM, M.D.

Dr. Abraham said that he wished to bring again before the Section the very valuable work that was being done by Dr. Brown, one of the members of the Section, in preparing these beautiful illustrations.

The patient gives a history of syphilis which he has had for twenty years, although this seemed to be confirmed for only ten years. He has been an inveterate cigarette smoker, and when he first presented himself for treatment two weeks ago there was quite an extensive area involved. He was advised to give up cigarette smoking, and the affected area has slightly decreased in size.

DR. BERENS said that the case was an interesting one and the illustrations were certainly very beautiful.

**Leptothrix Mycosis.** By F. J. QUINLAN, M.D. (*Published in full in THE LARYNGOSCOPE, page 135.*)

DISCUSSION.

DR. HURD said that he had come to the meeting tonight hoping that Dr. Quinlan would have something new to tell in regard to the cause or treatment of this affection, but had been disappointed. He had seen a number of cases of this kind and had given a good deal of attention to the subject in six of them. One of the cases had a very marked keratosis of the throat, involving the tonsils, pharyngeal vault, Eustachian tube, lingual tonsils, and false cord, and this case he had reported before the Eastern Section of the American Laryngological, Rhinological and Otological Society two years ago. The x-ray was used about thirty or forty times, and the patient, who was a medical student, said that he felt better after each treatment. At first there was no apparent change, then the tufts became softer, but he went away for the summer to the country in the middle of the treatment, and came back with exactly the same picture of the throat—no new tufts, none gone. The x-ray treatment was resumed, and after a week or so the tufts began to disappear, and after five or six weeks they all disappeared; now, after three years, his throat remains well.

Another patient, a woman, had a fair amount of tufts on tonsil, on the post-pharyngeal wall and on the lingual tonsil. She was treated by the x-ray once or twice a week through the mouth and through the tissues of the throat. The tufts showed no change for awhile. Then they softened up and disappeared gradually.

In regard to the pathological side of the question, he did not think the leptothrix had much to do with it. He had sometimes found mycelia and sometimes found other fungi, but none seem to be constant, and not enough leptothrix to cause the trouble. Under the microscope, it looks like hyperkeratosis. The tonsil will have a keratosis running around its surface into the crypt. His explanation of the tufts was that the crypts simply fill up with this horny material, and we find breaks in it here and there. The crypts fill up and it shells out and protrudes. Some authors report it as falling off in the night, but he had never seen that happen. Under the microscope, however, you could see these breaks in the horny layer. The surface epithelial cells become more elongated and the nuclei more indistinct until the nuclei disappear and

the elongated cells form a bundle. The tuft becomes thicker and thicker, and finally comes off in long strips. It was very doubtful to him whether or not the condition was due to some chemical action, as the tufts are found in the nose and extend even through the tear-duct into the eye. No action of the saliva can touch these points. He did not believe that the leptothrix had been found in the eye or nose. He was inclined to believe that the leptothrix was secondary. It occurs in all sorts of people, some healthy and some unhealthy. The etiology is still a very open question, but I think that the x-ray is worth trying in severe cases, but the treatment must be continued for several months.

DR. LESHURE told of a case of a woman—a telephone operator who had extensive mycosis of the naso-pharynx. Her hearing had become somewhat affected, and the mouths of the Eustachian tubes were covered with a mass of growth. He could not say whether or not the telephone was an etiological factor in the case. Another patient, a young man of 21, had an infection extending down into the trachea from below the true cords. His larynx is wide open and the bifurcation of the trachea can be clearly seen.

DR. CHAPPELL said that he had not arrived in time to hear the paper, but the discussion of the treatment was of interest. It reminded him of how many times in this room he had listened to the subject of treatment and had gone home believing that something must be the matter with his technique; but, after many trials of all that Dr. Quinlan had spoken of tonight, he had never seen any benefit derived from curettage, cautery, or burning with chloride of zinc, or acids; but on the contrary he believed they had done harm. He now gives such cases bichloride internally and sends them to the country, and has most gratifying results. He had a case last spring where it was very important that he should do something, and he tried everything possible without avail. The patient grew worse, and he finally sent her into the country with instructions to take bichloride internally, and in three weeks she came back well. He now treated all such cases in this way, giving them some simple treatment, and bichloride internally, and sending them to the country.

DR. HARRIS said that he was reminded by the last speaker of the many times this subject had been discussed before the Section in the last ten or twelve years, and especially of a paper by Dr. Wright, and it seems that the question of the etiology of the condition is just about where it was that evening ten years ago. Dr.

Wright then spoke of the question of hyperkeratosis. Dr. Delavan had then spoken of his success in giving no treatment except sending the patient away. His own experience was about the same as Dr. Chappell's, though sometimes by removing a part of the tonsil he had gotten rid of the disease, but not regularly. As for the other methods of treatment, he had given them up many years ago.

DR. MACKENTY said that in the past year he had seen three cases of this disease which Dr. Chappell's remarks prompted him to speak of. The diagnosis in one case was verified by Dr. Brooks; the others were not examined microscopically. Two of the cases were treated without result until they were sent to the country. They remained away for about two months and returned, one entirely well, and the other practically well. The third case was treated for six months by removing the visible points of disease with a curette and then applying Churchill's tincture of iodine. This case was almost well when treatment was discontinued.

In all these cases there were gastro-intestinal disturbances, and the condition of the gastro-intestinal tract is very important in its bearing upon the hygiene of the throat and mouth. All of the cases were put upon proper diet and enjoined to take exercise. It is important to look into the patient's general condition, especially the gastro-intestinal tract and correct the conditions there.

DR. MACKENTY said that last summer he had seen three cases of trichinosis with manifestations of an alarming nature in the larynx in one case. The condition puzzled him very much at first, for, besides having a very inflamed and edematous larynx with some infiltration of the arytenoid space, there was an acute condition in the lungs which simulated a subacute bronchopneumonia. After a week or ten days a blood count was made, and showed an eosinophilia of 50 per cent.; finally a piece of the muscle was removed, and trichinae were found. He intends to report these cases more fully later. Their mention here has not much bearing on the present paper, but trichinosis of the throat is not mentioned, so far as he knows, in the differential diagnosis of laryngeal cases.

DR. McCULLAGH said that he saw a case one day with one little plaque on one of the faucial tonsils, which was removed with a curette and preserved on a slide, and then cauterized the place with a little orthochlorphenol. The microscopic diagnosis showed leptothrix in the secretion, but the one cauterization relieved the condition, and there has been no recurrences.

DR. ABRAHAM said that in all of his cases of leptothrix the lymphatic tissue of the upper respiratory tract were involved, and there were lymphoid hypertrophies of the post-pharyngeal wall. When he first began this specialty he was very enthusiastic to try everything he read of in the treatment of the disease, until one day Dr. Delavan suggested simply giving the patient a good dose of podophyllin and sending them away into the country. Acting upon this advice, nearly all the cases recovered without any treatment, and did much better than those where he had tried the various acids. Only a few weeks ago he had seen a case in a school teacher, a very intelligent woman, who was a little run down, and had a lot of leptothrix scattered over her tonsils. She was sent into the country for two weeks and returned practically well. A week or so ago, she had written that she was suffering from some gastro-intestinal trouble, and she now complains again of the leptothrix.

DR. QUINLAN, in closing the discussion, said that the keynote of the whole condition was struck in the argument for the correction of errors of respiration and alimentation. It was astonishing to know the number of young girls budding into womanhood who were affected in this way, and who were cured by taking cold baths, proper exercise, and correcting candy habits and other errors of eating. Many others have lymphoid tissue occluding the nostrils, thereby preventing them from taking deep draughts of oxygen, and by toning up their subjective condition and giving them an equipment with which to fight the conditions, they will be greatly helped. These measures could not always be depended upon entirely, but they were valuable aids to local therapy.

In presenting this paper he had not attempted to present any original views, but had merely collected the results of recent investigation, and tried to classify the facts, with the idea of seeking the direction from which most light could be gained, provoking at the same time just such a discussion of the subject as had been elicited, from men who had seen many more of these cases.

**Primary Carcinoma of the Inferior Turbinate, with Report of a Case.** By WILLIAM WESLEY CARTER, A.M., M.D.

A more serious or important duty seldom comes to the rhinologist than that of making an early diagnosis in cases of suspected malignant disease of the nose. The disease is so insidious that its true nature is seldom recognized early enough to admit of its complete removal by operation, for the mortality is practically 100%, including both operative and nonoperative cases.

Primary malignant disease of the nose is rare and usually occurs in the ethmoidal or sphenoidal region. The case presented, therefore, is one of the rarest, as the disease is primary and in the lower part of the nose:

The patient was a married woman of 38, who applied for treatment in the Manhattan Eye, Ear and Throat Hospital in October.

Her family history is good and she had always been well up to the beginning of her present illness five months ago. This began with a tickling sensation in her right nostril and a constant desire to blow her nose. This was shortly followed by frequent spontaneous hemorrhages and occlusion of this nostril. She applied for treatment at a dispensary, where a growth was removed from the right nostril. She was relieved for the time, but all the original symptoms returned in four weeks. The growth was removed a second time by a private physician, who found that it was cancerous.

The woman appeared at the hospital three weeks after the last removal of the growth. She was in good physical condition and showed no signs of cachexia.

Examination of the nose showed a cauliflower-looking mass attached to the right inferior turbinate and filling the nasal cavity; it could not be seen by posterior rhinoscopy. There was a serous, odorless discharge. Otherwise the nose and its accessory cavities seemed normal.

Microscopical examination of the growth showed it to be a typical columnar-celled epithelioma.

Believing that a cancer of five months' standing or longer must have so seriously involved the adjacent tissues and especially the antrum, that an excision of the superior maxilla would be necessary, the case was referred to a general surgeon.

On October 4th, Dr. McCosh performed the following operation, the writer being present:

Ferguson's incision, reaching from the inner canthus of the right eye down by the side of the nose and through the upper lip, was made. All the tissues were elevated from the anterior wall of the antrum, and the soft tissues of the nose, from the margin of the nasal cavity. The nose could then be pulled to the left, giving a good view of the field and showing that the growth was confined to the inferior turbinate.

The whole of the external wall of the nasal cavity, a portion of the floor, the middle and inferior turbinates and a large portion of

the anterior wall of the antrum were removed. The operation extended far beyond the invaded area, which was the anterior two-thirds of the inferior turbinate. The external wound was closed and drainage effected through the nose. The patient was discharged from the hospital fifteen days after the operation. From examination of the specimens removed at time of operation, the diagnosis of cancer was confirmed by the pathologist of the Presbyterian Hospital. At the present time, three months after the operation, there has been no recurrence.

Points of interest in the case are:

1st—The extreme rarity of cancer of the nose, and especially of the inferior turbinate.

2d—The early age at which the growth appeared (it being almost unheard of before the 45th year).

3d—The age, location and extent of the growth seemingly being favorable for complete removal, we have here a fair opportunity to test the efficiency of the radical operation to cure malignant disease of the nose.

The first case of cancer of the nose was reported by Robin in 1852. As late as 1869, Finder, Cornil and Ranvier denied that malignant disease ever originated in the nose.

Dreyfus, who considers only those cases that have been confirmed by the microscope, states that out of 9,554 malignant tumors of the entire body, there were only 19 of the nose. Of these 15 were sarcomata and 4 carcinomata.

Herzfeld observed one case of carcinoma in 28,000 patients, and Finder observed 10 sarcomata and 4 carcinomata in 28,000 patients.

Maljutin states that out of 125 malignant tumors of the nose collected by him, only 17 were carcinomata.

Dr. Carter states that the total number of recorded cases of primary carcinoma of the nose to date is 98, this, however, includes the accessory cavities. It was difficult to separate these, as so much tissue was involved in many of the recorded cases that it was impossible to tell the real origin of the growth. It is probable, however, that the origin in most of these cases was in the sinuses, as this occurs much more frequently.

Sex has no appreciable influence in the etiology of the disease. Trauma is of doubtful importance. Irritated areas in the nose from which polypi have been removed have seemed to be the starting place in one or two cases.

There has been much discussion as to whether cancer is developed from polypi. Since polypi occur in 10% of nasal cases, it is more than likely that the two will sometimes occur together. Dr. Carter states, however, that we cannot overlook the possibility that long-continued irritation here, as in other parts of the body, may predispose to malignancy.

Some evidence has been presented to show that cancer may be developed from such benign growths as adenomata and papillomata after the cancerous age has been reached, and when they have been subjected to long-continued irritation. His evidence, however, is by no means conclusive.

*Headache, nasal obstruction and repeated hemorrhages* are the earliest symptoms.

*Pain*, at first neuralgic, later deep and boring in character, is a late symptom; it is present early if the growth is in the upper part of the nose.

The *discharge* may be serous, bloody or purulent and fetid. When the sinuses are involved, the early symptoms are those of empyema of those cavities.

*Infiltration* is not as rapid as in other parts of the body, but there is a tendency for the disease to extend upwards along the lymph channels that communicate with the subdural and subarchnoid spaces. Many of the cases terminate from cerebral involvement. Recurrence is rapid after incomplete removal; in Dr. Carter's case the growth returned in four weeks on both occasions when it was partially removed.

*Metastatic deposits* seldom occur.

*Glandular involvement* does not occur as often as in malignant disease in other parts of the body. From an anatomical point of view, the lateral pharyngeal gland, the gland in front of the axis, and the glands near the greater cornu of the hyoid bone, should be the first involved.

*Cachexia* is a late symptom.

In making the *diagnosis*, we must differentiate from sarcoma, benign tumors, tuberculosis and syphilis, also from chronic inflammatory conditions.

There should be immediate co-operation between clinician and pathologist in suspicious cases, and when a diagnosis of cancer is made the radical operation should be performed immediately after the removal of the specimen for microscopical examination, lest

the cancer cells liberated by this traumatism should be taken up by the blood vessels and lymphatics and disseminated beyond the intended operative field. Cells thus taken up have been seen in the vessels by several pathologists.

The *prognosis* is bad. There is no authentic case on record where recurrence has not taken place after the operation; often the recurrence has taken place before the patient was able to leave the hospital.

The *duration* of the disease depends upon the age of the patient and the nature and location of the growth. The disease progresses more rapidly in the aged and when it is located in the upper part of the nose. The medullary and adeno-carcinomata are the least malignant and last the longest. The average duration of the disease is three years; exceptions are seven months, and fourteen years. The only variety offering any ground for favorable prognosis is the so-called cylindroma of Billroth.

*Radical operative treatment* alone should be considered in dealing with these cases. The dangers of the operation are hemorrhage, pneumonia, erysipelas, sepsis and meningitis. The choice of operation should be made according to the location and extent of the growth, and with a view to giving access to the greatest amount of nasal tissue. Intranasal operations are useful only as palliative measures. In some cases a modified Caldwell-Luc operation may be effective. Where both sides are involved, Ollie's operation, which consists in sawing through the nasal bones and turning the nose forward on the face, is to be preferred. When the antrum is involved, excision of the superior maxilla is the only operation to be considered.

#### DISCUSSION.

DR. HARRIS said that he had been much interested in two points brought out in this carefully prepared paper. The first was the question of degeneration from benign growths. He himself had been much interested in the observation of malignant diseases of the nose, but had never yet seen a pure case of carcinoma, though he had seen two cases of adeno-carcinoma—one of them in a man over 70 years of age. In this case, the diagnosis at first was adeno-sarcoma. The patient lived for a year after he came under Dr. Harris' care, and died from a general breaking down of the system.

In regard to papilloma, he recently had been looking up the statistics on this subject, and, as far as he could find, it was an exceedingly rare affection. He had only been able to find 8 or 10

cases of true papilloma, and these did not show any great tendency to degeneration. Some six or seven years ago he had looked up the statistics of sarcoma, and found 104 cases, including 6 or 7 of his own. It is acknowledged by all that sarcoma is a more common affection than carcinoma. If that is so, it hardly seems possible that 80 cases of carcinoma could be collected. He was inclined to think that these 70 or 80 cases represented cases of the accessory sinuses, and he would suggest to Dr. Carter that in completing the paper for publication he indicate as far as possible the number of cases of undoubted primary carcinoma.

DR. CARTER, in closing the discussion, said that Dr. Harris was correct in stating that there were not so many cases of primary carcinoma of the nose as had been mentioned in the statistics. He had intimated in his paper that the number was too large, as many of the cases included had never been examined with the microscope and there was some question as to the diagnosis. And then again carcinoma of the accessory sinuses was included, and this is generally admitted to be much more frequent than that of the nose. Primary carcinoma of the nose is an extremely rare condition. In these statistics it is difficult to separate the cases of primary disease of the nose from those of the accessory sinuses, for in some instances the tissues were so generally involved that it was impossible to locate the real origin.

**A New Tonsillotome.** By FRANZ C. RUPPERT, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

#### DISCUSSION.

DR. CARTER said that he did not see much advantage in the instrument, as the cutting blade has to be pulled forward and the shoulder of this is opposed by the anterior pillar. If this were rigid, the instrument could not be used at all. He did not see much advantage over the old-style tonsillotome which is pushed in to catch the tonsil.

DR. BERENS said that the instrument was certainly a very clever device.

DR. McCULLAGH said that as the anterior pillar is not rigid, it can be pushed aside by the ordinary flat tonsillotome if sufficient pressure is made, and he thought that the blades of the ordinary Matthieu could be gotten down about as close to the capsule of the tonsil as this one.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

*Regular Meeting, December 11, 1906.*

OTTO T. FREER, M.D., President.

**Post-Mortem Findings of a Cerebellar Abscess Causing Sudden Death.** By JOSEPH C. BECK, M.D.

The pathological specimen is still in a fresh state and consequently a full description is impossible at this time, owing to the fact that I do not wish to disturb the brain until it is properly hardened. I present it, however, as we have not many opportunities to see such, and, secondly, because I wish to report the clinical side of the case, which was very interesting to me.

Jos. W., 19 years old; has had a running ear on the right side ever since childhood, following measles. The discharge was very thick and foul-smelling. He was never treated for it, and it never bothered him until he got a cold, six weeks ago, when a dull ache developed on the right side of his head, which constantly increased until the operation.

October 28, 1906.—Pain almost unbearable. Dr. L. J. Hughes, my assistant, who saw him at this time, made the following notes of his findings: The external auditory canal is swollen and stenotic; foul-smelling pus fills the canal; granulations appear to take the place of the tympanic membrane, and the upper and posterior wall of the auditory canal seems to sag. The hearing is markedly reduced for air and also bone conduction. (Special mention is made that there are no symptoms of dizziness, noises, or nystagmus, or other eye findings in this case.) No tenderness over the mastoid, but some tenderness over the region of the zygoma on percussion. Temperature, 97°; pulse, 55-60. Slight cough.

Deviated septum to left and a general naso-pharyngitis. General condition below par, due to loss of appetite and sleep.

I saw the boy on October 30, 1906, and found the conditions as stated above; recommended immediate radical operation, believing there was a necrosis of the temporal bone through the tegmen tympani with involvement of the mastoid. I expected also to find a fistula going towards the cerebellum, inasmuch as he had a sub-normal temperature and slow pulse.

Novemeber 1, 1906.—Patient was operated on, and I found a large colesteatoma, which I was able to eradicate completely, finding no evidence of necrosis of the tegmen tympani or any other part. I concluded the operation and put the patient to bed in good condition. Next morning his report was: "Rested well; temperature, 99°; pulse, 60." From that day until the evening before he died, which was nine days in all, he had no headache, and otherwise felt well. The wound was such as we usually find in such cases. On the fifth day following operation, there was a slight evidence of facial paresis, which I attributed to the tight packing. The pulse and temperature remained about the same all the time; temperature, 97°; pulse, 50-60.

On the evening of the eighth day after operation he complained of some headache, which continued all night and the next day. I left him, however, in the evening while he was eating a hearty meal. About 5 a. m. next day, I was called up and notified that he had given a sudden shriek, got blue, and died.

A necropsy was performed as quickly as possible, in order to prevent post-mortem changes, and I found the field of operation in excellent condition, and no evidence of a fistula or necrosis. On removing the calvarium I found normal meninges. In severing the tentorium cerebelli and turning out and back the brain, I discovered a small opening in the right half of the cerebellum, close to the median line, from which pus escaped, and on enlarging this opening I got about two tablespoonsful of this pus. Measuring the cavity, as you see, with this probe, it is about  $2\frac{1}{2}$  inches in one direction, and  $1\frac{1}{2}$  inches in the other. It appears to burrow toward the fourth ventricle, but that I shall determine better later, when the brain has been properly hardened. I should like to explain his sudden death by the rupture of this abscess into the fourth ventricle. The sinuses were absolutely normal. There were no evidences of any necrotic areas from the attic or mastoid cells anywhere. I chiseled open the semicircular canals and cochlea; also facial canal, and macroscopically found no evidences of disease.

I am inclined to think that the infection must have passed from the mastoid cells through some very small opening and infected the cerebellum. This abscess very likely has existed for a long time, in a quiet state, but the mastoid operation may have set up fresh activity and caused it to rupture.

## DISCUSSION.

DR. GEO. E. SHAMBAUGH: This interesting specimen which Dr. Beck has demonstrated brings before us in an impressive way one of the most serious results of chronic suppurative otitis media. This abscess is located in that part of the cerebellum which comes in relation to the posterior surface of the pyramid of the temporal bone. This is the place where cerebellar abscess arising from suppurative ear disease is most often located. The duration of this abscess is uncertain from the clinical history. It is a surprising thing that an abscess as large as this could be located in a structure like the cerebellum without having produced very pronounced symptoms. Yet it is well known that brain abscess may occur in chronic suppurative ear disease and exist for a long period without causing any very pronounced symptoms.

How the infection got to the cerebellum in this case is an interesting question. It is not unusual that no passage is discovered at the time of operation. There are, of course, a number of routes by which a cerebellar abscess is known to arise. One is by extension through the lateral sinus, this structure being first involved; another is by the way of the labyrinth, which is involved in the suppurative process, and the extension occurs to the cerebellum either along the meatus internus or along the aquaeductus cochleæ or aquaeductus vestibuli. I should like to ask Dr. Beck whether any symptoms were noted in this case suggesting the possible involvement of the labyrinth.

**Aphonia of Unknown Origin and of Six Months' Duration in a Two and one-half year old Child; Discovery of an Open Safety-Pin in the Larynx.** By JAMES T. CAMPBELL, M.D.

A foreign body in the larynx, causing aphonia, is rare indeed. Symptoms vary according to the size and shape of the foreign body. Small bodies, such as fishbones, may remain in the larynx for an indefinite length of time without interrupting respiration, and will merely give rise to coughing and a sensation of discomfort.

Generally there is great anxiety and terror on the part of the patient accompanying the entrance of any foreign body, however small, into the air passages.

As a rule, the history of the case is clear, and the laryngoscope will verify or disprove the patient's statement. Where there is a doubt, a skiagraph should decide the case in question.

The little girl was given a dose of castor-oil by her father while her mother held her. Violent coughing immediately ensued and persistent aphonia resulted. Six months later she was brought to me. She was anesthetized, and with the laryngeal mirror I saw a metallic body lying on the upper surface of the right vocal cord. With the Schroetter tube forceps I grasped this body and withdrew an open safety pin 23 mm. in length and 15 mm. in extreme breadth.

Thirty-six hours later the child was taken home, speaking as plainly as before the castor-oil episode.

**Trypsin Treatment of a Case of Malignant Disease Involving the Left Tonsil, Base of Tongue and Epiglottis.** By JAMES T. CAMPBELL, M.D.

The author concludes from the relative distribution of cancer of the alimentary tract, that the pancreatic ferments and bile salts might be supposed to have an inhibiting or preventative action on cancer. He then reviews the experimental work of Dr. J. Beard upon mice infected with Jensen's Mouse Tumor, in which injections of trypsin were used with marked effect upon the tumor. Beard's recommendations as to the proper method of administering *Injectio Trypsini* and *Injectio Amylopsini* in human beings are given, and the encouraging results of this method as used by Dr. William J. Morton in twenty-nine cases.

Dr. Campbell then reports at some length his experience with *Injectio Trypsini* and *Injectio Amylopsini* in treating what was apparently an inoperable carcinoma of the base of the tongue, left tonsil, and epiglottis. The improvement was marked, pain subsided, and swelling and induration were greatly reduced in the seven months preceding the report. Unfortunately the diagnosis of carcinoma was not confirmed by microscopic examination.

DISCUSSION.

DR. OTTO T. FREER: We are greatly indebted to Dr. Campbell for reminding us of the possible usefulness of trypsin in the treatment of malignant tumors. Nevertheless, the absence of a histologic diagnosis in the case he presents to us deprives it, to my mind, of any claim to represent the effect of the remedy upon carcinoma, for there are so many conditions in the throat that to the naked eye may simulate a malignant epithelial neoplasm, not to speak of the possibility of sarcoma, that the diagnosis from chronic inflammatory round-celled infiltration of the arcus palatoglossus or palatopharyngeus surrounding the tonsil, or the specific granu-

lation tumors, may be impossible by mere inspection, so that, while one may feel reasonably sure of the presence of a beginning carcinoma, to convince others it is necessary to have the sustaining evidence of the microscope.

I suggest that Dr. Campbell follow up the subject and excise tissue for a histologic diagnosis in future cases before he uses the trypsin. It does not, however, seem to me that much will be accomplished with the remedy, for while central parts of a malignant growth of low vitality whose nutrition is impaired because of occlusion of vessels may be digested by the ferment, the vigorous malignant epithelial cells at its periphery will offer at least as much resistance to the solvent action of trypsin as the cells of the normal tissue embedding them.

DR. JOSEPH C. BECK: I should like to know the occupation of the patient, whether he ever worked with hides or cattle.

DR. CAMPBELL: He was a clerk and brassworker.

DR. BECK: Then I should like to ask the doctor if the tissues were examined microscopically for the ray fungus?

DR. CAMPBELL: Yes, and not found.

DR. BECK: I only wish to say that actinomycosis cannot be otherwise excluded. Patients who have such bad teeth as this patient has and had may easily get infected with the actinomyces. Besides, this growth is firmly connected with the lower jaw. That the patient got so much better under the treatment and is still improving, may also speak in general against carcinoma, because in the few cases that I know of where trypsin, nucleinic acid, methyl blue and several other similar substances have been found to benefit the patient, the effect of these drugs soon passed off, and if the condition was cancer it rapidly grew and destroyed the life of the patient.

DR. SHAMBAUGH: The first case reported by Dr. Campbell is a most interesting one. The probable diagnosis of carcinoma in the absence of the histological findings has been in this case substantiated as nearly as could be possible from the clinical history. The manner in which the improvement followed the administration of the treatment seems to me to justify the assumption that the improvement was most probably the direct result of this treatment.

DR. CAMPBELL, closing: There is reasonable proof that there is no possibility of the disease being actinomycosis in the fact that there has been no tendency toward breaking down of the tumors into abscesses. Also, that, in careful microscopical examinations

made by Prof. Zeit, no ray fungi were found. For lumpy-jawed cattle large doses of potassium iodid have been given with success, and similar treatment should prove beneficial when used for human beings who suffer with actinomycosis. In the case presented, however, very large doses of the iodid were given without success, and he gradually became worse.

It is not a fact that 28% of mice suffering from Jensen's mouse-tumors recover. They all die! When superficial ulceration of the tumor occurs, emaciation rapidly ensues. Ehrlich claimed that 30 or rarely 40% of mice were successfully inoculated with Jensen's mouse-tumor. Bashford, however, repeatedly obtained success in 90% of his attempts.

**A Peculiar Defect of Speech Following, and Partially Attributed to Diphtheria.** By ELMER L. KENYON, M. D.

Dr. Kenyon presented the patient in whom this condition existed. The defect consisted of a marked, rough, nasal, gurgling sound in place of the normal s and z sounds. The probable etiology and the treatment were covered fully. A complete report will be published later.

DISCUSSION.

DR. OTTO T. FREER: The Society owes Dr. Kenyon gratitude for this able and clear presentation of a new subject. So much that appears on programs is a monotonous repetition of what has gone before that it is refreshing to find a new theme so ably handled.

**Sinus Thrombosis and Necrosis of the Horizontal, Semicircular and Facial Canals, following Chronic Purulent Otitis Media, Cholesteatoma, Peri-Sinus Abscess, Resection of the Jugular Vein, Radical Operation, Recovery.** By LOUIS OSTROM, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. H. KAHN: This evening, in two instances, that of the demonstration of the cerebellar abscess and the paper now under discussion, a note on the presence or absence of nystagmus has been omitted. The present state of otology recognizes this symptom as of great value in the diagnosis of suppurative affections of the static portion of the labyrinth, and of some use, especially in the differential diagnosis of cerebellar abscess. This has been brought out by Barany, in an exhaustive paper in the *Monatschrift für Ohren-*

heilkunde, by Neuman in the *Archiv. für Ohrenheilkunde*, and Friedreich in his monograph on Labyrinthenterung. All of the before-mentioned authors agree that in diseases of the static apparatus, when the eyes are rotated upward and outward to the opposite side, a rotary nystagmus appears, which is absent when the eyes are turned toward the affected ear. Cerebellar abscess produces exactly the opposite phenomena, i. e., nystagmus, when the eyes are rotated to the affected side and none when turned to the opposite side.

The point emphasized, that the patient hears after destruction of a part of the labyrinth, is, of course, open to doubt, and I am of the opinion that the doctor has deceived himself, since it is well known that it is difficult to prove a one-sided deafness when the other ear is normal.

DR. JOSEPH C. BECK: In regard to the allusion of the previous speaker that I did not say much about the nystagmus in my case of cerebellar tumor, I wish to plead guilty that I did care more to open that mastoid as quickly as possible, in order that I might save his life, rather than to scientifically examine the case. Next time I promise to do better.

DR. SHAMBAUGH: There are several points I would like to refer to in the interesting case reported by Dr. Ostrum. In the first place, I am not convinced that the patient was able to hear in the affected ear after his recovery from the operation. That the labyrinth may be invaded by a suppurative process and there still be preserved the ability to hear, is a phenomenon we sometimes see, in cases, for example, of cerebro-spinal meningitis which extends along the meatus internus to the cochlea and where, after recovery, there are sometimes left more or less extensive islands of hearing. Whether it is possible for any hearing to be present where there exists a gross lesion such as is reported in this case where a fistula existed in the labyrinth from which pus was seen to exude, is quite a different matter.

The extreme difficulty in excluding the well ear in testing the hearing in cases of one-sided deafness, especially where it is a question whether or not there is a total defect in the one ear, leaves in my mind a margin of doubt whether this case could hear in the affected ear.

There is just one point in the handling of the case I would criticise; that is the primary closure of the opening back of the ear. Such a closure is of great assistance in the after-treatment

of many cases where the radical operation has been performed, but such a closure is not suitable for all cases operated on by the radical method. In this particular case there were two contra-indications to this primary closure, either one of which should have been sufficient cause for leaving the wound open. One was the presence of a cholesteatoma and the other was the fact that the sinus was exposed over a considerable area and its surface was bathed with pus which left the possibility of a sinus involvement still present.

## PRESENTATION OF INSTRUMENTS.

- a. **Simple Epiglottis Retractor.**
- b. **Bernays' Sponge with Attachment for Easy Extraction.**
- c. **Localizer of Superior Oblique in the Killian Operation.**
- d. **Posterior Submucous Elevator.**
- e. **Self-Retaining Nasal Retractor.**
- f. **Simple Nasal and Post-Nasal Packing.**

By LOUIS OSRROM, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

## DISCUSSION.

DR. JOSEPH C. BECK: I wish to compliment the doctor on the many practical devices he has shown us tonight; particularly this instrument to localize the pulley of the superior oblique. When I operate next by the Killian method, I want to have one of these instruments at hand.

I cannot agree with the previous speaker that the removal of the pulley is of no consequence. I know it is productive of a squint and diplopia, which is permanently present in most of the cases that I have seen, and, if possible, is to be avoided. However, at this point, I wish to say that in my last case of radical sinus operation for pan-sinusitis, I followed the advice of Coakley and many others in not removing the floor of the frontal sinus over the orbital cavity, only so much of the floor and back into the ethmoid cells as to get perfect drainage, and had a good result without any chance for infectious cellulitis or displacement of the eyeball.

As to post-nasal packing, I use the Bellox canula and cotton tampon, and cannot report anything but success with it when called upon to use it.

DR. H. KAHN: The instrument shown for the localization of the superior oblique muscle when doing the Killian operation on the frontal sinus may be very valuable, if the typical operation is performed, but the modification proposed by Hajek in a recent number of *Fraenkel's Archives* makes it unnecessary. Following this modification there is a diplopia for a short time, but this soon disappears, and the patient is no worse for having had his superior oblique detached.

DR. OTTO T. FREER: I wish to especially commend Dr. Ostrum's very ingenious use of the rubber band to uplift and pull forward the epiglottis during endolaryngeal manipulations. I have found in a number of cases great difficulty in removing papillomata growing on the anterior third of the cords where the epiglottis overhung the larynx in a decided manner, and I think that Dr. Ostrum's device will be of great use in such cases.

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